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VERY SHORT RANGE STATISTICAL FORECASTING OF AUTOMATED
WEATHER OBSERVATION. (U) NATIONAL WEATHER SERVICE
SILVER SPRING MD TECHNIQUES DEVELOPM. R G MILLER

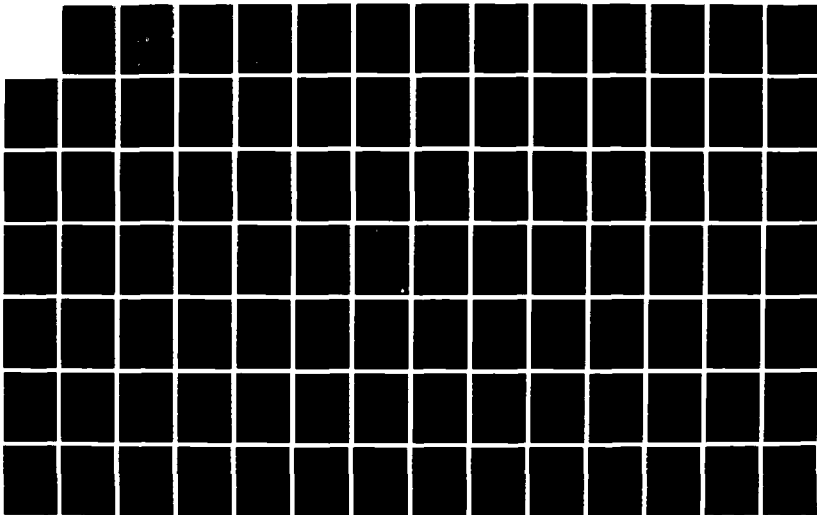
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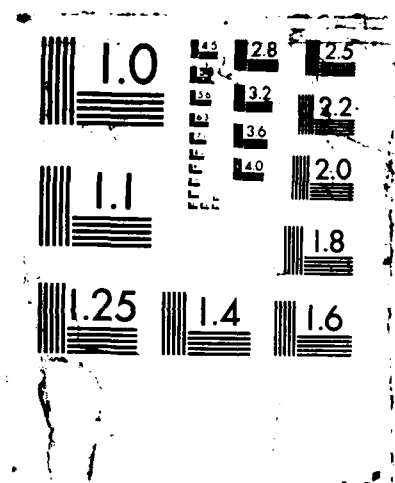
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Very Short Range Statistical Forecasting of Automated Weather Observations

Robert G. Miller, Ph. D.



January 1988

Final Report

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16. Abstract A procedure is developed for providing weather forecasting guidance over the short range period of 10, 20, 30, ..., 120 minutes. It uses the Automated Weather Observing System (AWOS) elements as predictors and predictands. The model is founded on Markov assumptions and uses multivariate regression as the statistical operator. Details are given on how the Generalized Exponential Markov (GEM) model compares with persistence. Tests are performed on a test sample of almost 400,000 cases. Overall, GEM succeeds in bettering current short range weather forecasting techniques (i.e. persistence) over the twelve projection periods of 10, 20, 30..., 120 minutes. The ability of GEM to successfully predict VFR to IFR, and IFR to LOW IFR changes in both visibility and ceiling is also demonstrated.					
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1. INTRODUCTION

The Federal Aviation Administration (FAA) is addressing a need for weather information at unmanned airports and heliports through their Automated Weather Observing System (AWOS). An AWOS observation is made at a site by taking minute by minute readings from meteorological sensors. From the most recent 30 minutes of these readings, an algorithm creates a weather observation which attempts to emulate the human weather observation. The FAA also sees a need for short range weather forecasts (inside a 2 hour time period) for helicopters and for some commercial and private aircraft. An example of this need is evidenced in the fact that helicopter flights average only 22 minutes in duration.

The Techniques Development Laboratory has been working under an interagency agreement between the National Weather Service (NWS) and the FAA to determine the feasibility of making automated aviation forecasts inside the 2 hour time period. The methodology employed is GEM -- a generalized exponential Markov model (see Miller 1981). Specifically, GEM takes all of the elements measured or derived from an AWOS observation at a particular time and predicts the AWOS elements that will be observed 10, 20,...,120 minutes hence. Predictions are via regression equations which were developed using two full years of data (consisting of AWOS outputs and sensor readings). The regression equations predict the probability distribution of a weather element falling into specific categories. A detailed discussion of the elements and their categories is contained in previous FAA interim reports (Miller, 1984, 1986, and 1987). See also Appendix F of this report.

2. DATA ANALYSIS

The data sample covers a 3 year period of collection at the NWS's test and evaluation facility at Sterling, Virginia from April 1984 to April 1987. A sample of nearly 1 million observations, from April 1984 to April 1986, was used to develop the prediction equations.

For example, the set of 10 minute (10M) visibility forecast equations with K predictors is of the form:

$$\begin{array}{l} \text{Probability of visibility} \\ \text{10M hence of } 0 \text{ to } < 1/2 \text{Mi} = A_0 + A_1 \times X_1 + \dots + A_K \times X_K \end{array} \quad (1)$$

$$\begin{array}{l} \text{Probability of visibility} \\ \text{10M hence of } 1/2 \text{ to } < 1 \text{Mi} = B_0 + B_1 \times X_1 + \dots + B_K \times X_K \end{array}$$

.
.
.

$$\begin{array}{l} \text{Probability of visibility} \\ \text{10M hence of } \geq 7 \text{Mi} = F_0 + F_1 \times X_1 + \dots + F_K \times X_K \end{array}$$

The unknown A's, B's,..., F's are obtained through least squares regression using the regression estimation of event probabilities (REEP) procedure (see Miller, 1964). When the X's are available from an AWOS observation, a forecast is made by carrying out the calculations on the right in each equation in (1). Categorical visibility forecasts are then made from the set of forecast probabilities using a procedure which maintains a constant forecast variance at

all projections and then chooses the category with the maximum value as the final forecast (see Appendix B for further details).

3. VERIFICATION

The question is: Do these forecasts possess any skill?

Since human forecasts (expressed as the predominant conditions of the terminal forecasts in the FF) have been dominated by persistence inside 2 hours (see Miller and Perrone 1984) we have chosen to measure GEM's skill against persistence for the projection period of 10 to 120 minutes. In all of what follows GEM is compared directly against persistence--a 'forecast' which says that the present conditions will not change in the future from what they are now. Appendix D contains the evaluation plan adopted by the NWS's Offices of Meteorology and Space, developed for the purpose of the comparative verification between AWOS-GEM and persistence.

As stipulated in the evaluation plan, Tables 1 and 2 contain all the necessary tables and scores for each 10 minute projection out to 120 minutes for all the AWOS elements. (There can be found in Appendix E, to help in understanding what is in each of the tables, a full description is given here of the 10 minute visibility comparative verification between AWOS-GEM and persistence.

Tables 1 and 2 contain the contingency tables and scores for AWOS-GEM and persistence, respectively, obtained for a test sample on 10 minute visibility forecasts.

For a full description of the scores and the Chi-Square score see Appendix C.

The Chi-Square score is not a skill score but a measure of the goodness-of-fit employing the Chi-square statistic as a measure of the overall balance or lack of fit in the verification contingency tables. This is an attempt to express bias as an anticipated payment. It is measured using the row and column totals. The value of the Chi-Square statistic is high because high values signify a large deviation from the expected frequencies and observed frequencies. The Chi-Square statistic is a measure of the discrepancy between the observed and expected frequencies. The Chi-Square statistic is a measure of the discrepancy between the observed and expected frequencies.

- a. There are 100,000 test samples (test data: April 1986 to April 1987).
- b. GEM had 100 correct predictions in the category 0 to less than 1/2 mile out of 1270 forecasts. The event was observed 1351 times. GEM's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215. The event's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215.
- c. GEM's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215. The event's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215.
- d. GEM's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215. The event's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215.
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- f. GEM's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215. The event's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215.
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- h. GEM's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215. The event's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215.
- i. GEM's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215. The event's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215.
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- n. GEM's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215. The event's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215.
- o. GEM's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215. The event's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215.
- p. GEM's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215. The event's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215.
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- r. GEM's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215. The event's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215.
- s. GEM's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215. The event's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215.
- t. GEM's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215. The event's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215.
- u. GEM's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215. The event's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215.
- v. GEM's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215. The event's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215.
- w. GEM's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215. The event's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215.
- x. GEM's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215. The event's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215.
- y. GEM's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215. The event's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215.
- z. GEM's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215. The event's probability of being correct was 0.0785 and its probability of being incorrect was 0.9215.

Table 1. Test sample verification contingency tables for AWOS-GEM on 10 minute forecasts of visibility.

Forecast Category (Miles)		Verifying Observation (Miles)						Total Forecasts
		0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7+	
A W O S G E M	0 < 1/2	1032	162	52	13	6	5	1270
	1/2 < 1	261	1549	657	90	31	16	2604
	1 < 3	52	476	14562	2884	196	103	18273
	3 < 5	5	34	2341	27660	4312	382	34734
	5 < 7	1	3	133	3405	26069	4264	33875
	7+	0	0	76	351	4251	274368	279046
Total:		1351	2224	17821	34403	34865	279138	369802
Observations								
Biases:		0.94	1.17	1.03	1.01	0.97	1.00	
Percent Correct: 93.3581								
Heidke Skill Score: 0.83824								
Chi Score: 112.57								
Threat Score: 0.67582								
Cases = 369802								

Table 2. Test sample verification contingency tables for persistence on 10 minute forecasts of visibility.

Forecast Category (Miles)		Verifying Observation (Miles)						Total Forecasts
		0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7+	
P E R S I S T E N C E	0 < 1/2	1061	249	110	17	7	6	1450
	1/2 < 1	197	1382	590	40	11	5	2225
	1 < 3	80	530	13926	2998	207	112	17853
	3 < 5	8	47	2828	26673	4251	564	34371
	5 < 7	2	11	243	4205	25845	4602	34908
	7+	3	5	124	470	4544	273849	278995
Total:		1351	2224	17821	34403	34865	279138	369802
Observations								
Biases:		1.07	1.00	1.00	1.00	1.00	1.00	
Percent Correct:		92.6809						
Heidke Skill Score:		0.82175						
Chi Score:		7.47						
Threat Score:		0.66246						
Cases =		369802						

Next, tables are provided showing all of the verification scores from 10-120M on the test sample.

- o Table 3 gives Brier scores for each AWOS element (precipitation is not available because the sensor element during this period was inoperative). A tally is provided showing the number of situations in which GEM and/or persistence dominated. (Low Brier scores are better than high scores) Note that except for wind direction GEM had better probabilities than conditional persistence (derived from the relative frequencies of each category given the element's present condition) for all projections.
- o Table 4 gives the percentage of correct forecasts (hits). Here GEM has over a 3 to 1 edge in better scores.
- o Table 5 gives the Heidke skill scores. GEM has over a 2 to 1 edge.
- o Table 6 gives the Threat scores for categories 1 and 2 of visibility and ceiling for which GEM holds a 6 to 1 edge.
- o Table 7 gives the Log scores for visibility and ceiling in which GEM has better scores in all comparisons with persistence.

A full set of comparisons is as follows:

	GEM Better	Persistence Better	Ties
o Brier Score	153	12	15
o Percentage Correct	114	34	32
o Heidke Score	97	43	40
o Threat Score	18	3	3
o Log Score	24	0	0
Overall	406	92	90

In summary, we consider that an over 4 to 1 advantage by GEM demonstrates its decided skill over persistence at all projections from 10 minutes out to 120 minutes.

In conjunction with this summarizing statement, Appendix D contains a copy of the findings of the NWS's Committee on Analysis and Forecasting Technique Implementation (CAFTI) after a presentation was made at their November 18, 1987 bimonthly meeting for their evaluation of AWOS-GEM's meteorological significance and operational usefulness.

BRIER SCORE
GEM VS. PERSISTENCE

GEM

CATEGORY	PROJECTION TIME											
	10	20	30	40	50	60	70	80	90	100	110	120
PRESSURE	0.041	0.069	0.094	0.118	0.141	0.162	0.183	0.203	0.223	0.242	0.259	0.276
TEMPERATURE	0.233	0.314	0.375	0.424	0.461	0.489	0.512	0.535	0.556	0.578	0.599	0.617
DEWPOINT DEPRESSION	0.215	0.272	0.315	0.348	0.373	0.391	0.406	0.420	0.433	0.451	0.468	0.485
WIND SPEED	0.186	0.201	0.211	0.217	0.222	0.226	0.231	0.234	0.238	0.242	0.246	0.249
WIND DIRECTION	0.495	0.577	0.620	0.647	0.666	0.681	0.693	0.703	0.711	0.719	0.725	0.730
CLOUD HT 1	0.106	0.158	0.204	0.239	0.264	0.284	0.300	0.314	0.327	0.338	0.349	0.358
CLOUD HT 2	0.110	0.156	0.188	0.208	0.222	0.229	0.235	0.241	0.247	0.252	0.256	0.259
CLOUD HT 3	0.071	0.088	0.096	0.100	0.102	0.104	0.105	0.106	0.107	0.109	0.109	0.110
CLOUD COVER 1	0.152	0.214	0.260	0.289	0.308	0.322	0.334	0.345	0.354	0.363	0.371	0.378
CLOUD COVER 2	0.143	0.188	0.217	0.232	0.242	0.248	0.253	0.258	0.262	0.266	0.268	0.271
CLOUD COVER 3	0.179	0.191	0.192	0.197	0.199	0.199	0.199	0.199	0.199	0.199	0.199	0.199
VISIBILITY	0.162	0.152	0.173	0.198	0.214	0.227	0.238	0.249	0.259	0.267	0.275	0.282
PRECIPITATION	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
GUSTS	0.118	0.124	0.130	0.132	0.135	0.137	0.139	0.141	0.144	0.146	0.149	0.150
CEILING	0.056	0.085	0.125	0.155	0.175	0.190	0.203	0.215	0.225	0.234	0.242	0.249
TOTAL CLOUD AMOUNT	0.159	0.200	0.246	0.276	0.298	0.311	0.322	0.333	0.342	0.351	0.359	0.368

PERSISTENCE

CATEGORY	PROJECTION TIME											
	10	20	30	40	50	60	70	80	90	100	110	120
PRESSURE	0.041	0.069	0.094	0.118	0.141	0.163	0.184	0.204	0.223	0.242	0.260	0.276
TEMPERATURE	0.233	0.314	0.376	0.425	0.463	0.492	0.515	0.539	0.561	0.585	0.607	0.626
DEWPOINT DEPRESSION	0.215	0.273	0.316	0.350	0.376	0.395	0.411	0.425	0.441	0.461	0.481	0.500
WIND SPEED	0.196	0.212	0.222	0.229	0.234	0.238	0.242	0.246	0.250	0.254	0.258	0.261
WIND DIRECTION	0.493	0.574	0.617	0.644	0.664	0.678	0.690	0.700	0.709	0.716	0.723	0.728
CLOUD HT 1	0.121	0.190	0.240	0.271	0.294	0.311	0.326	0.339	0.352	0.363	0.373	0.382
CLOUD HT 2	0.122	0.175	0.208	0.226	0.238	0.246	0.253	0.259	0.264	0.270	0.273	0.277
CLOUD HT 3	0.077	0.096	0.103	0.106	0.108	0.109	0.110	0.111	0.113	0.114	0.114	0.115
CLOUD COVER 1	0.162	0.235	0.280	0.305	0.323	0.336	0.348	0.357	0.367	0.376	0.383	0.390
CLOUD COVER 2	0.155	0.205	0.232	0.246	0.255	0.261	0.266	0.270	0.274	0.278	0.281	0.283
CLOUD COVER 3	0.085	0.108	0.118	0.123	0.125	0.127	0.128	0.130	0.131	0.133	0.133	0.134
VISIBILITY	0.125	0.166	0.190	0.208	0.223	0.236	0.247	0.258	0.268	0.276	0.285	0.293
PRECIPITATION	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
GUSTS	0.129	0.135	0.140	0.142	0.144	0.146	0.148	0.150	0.152	0.155	0.157	0.158
CEILING	0.079	0.131	0.167	0.190	0.206	0.219	0.231	0.241	0.251	0.259	0.267	0.273
TOTAL CLOUD AMOUNT	0.150	0.222	0.265	0.290	0.307	0.321	0.332	0.342	0.351	0.359	0.366	0.373

	11	12	13	13	13	14	14	14	13	13	14	13	TOTALS
NUMBER FAVORING GEM													157
NUMBER FAVORING PERSISTENCE	1	1	1	1	1	1	1	1	1	1	1	1	12
TIES	3	2	1	1	1	0	0	0	1	1	0	1	11

Table 3. GEM and persistence Brier scores for each predictand element and for each 10 minute projection from 10 minutes to 120 minutes. The total number favoring each is given with a final total over all elements and projections. Precipitation is not shown because of sensor inoperability.

PERCENT CORRECT
GEM VS. PERSISTENCE

GEM

CATEGORY	PROJECTION TIME											
	10	20	30	40	50	60	70	80	90	100	110	120
PRESSURE	97.89	96.44	95.12	93.80	92.51	91.25	90.02	88.83	87.61	86.43	85.28	84.20
TEMPERATURE	86.91	81.39	76.77	72.69	69.42	66.88	64.76	62.60	60.52	58.18	55.82	53.70
DEWPOINT DEPRESSION	87.78	83.77	80.41	77.41	75.11	73.87	72.89	72.40	71.21	69.45	67.51	65.66
WIND SPEED	87.31	85.79	85.00	84.55	84.16	83.83	83.50	83.31	83.14	82.90	82.58	82.39
WIND DIRECTION	68.35	61.11	56.78	53.97	51.68	49.93	48.45	47.15	45.99	45.02	44.15	43.27
CLOUD HT 1	93.52	89.43	86.36	84.04	82.34	80.97	79.85	78.64	77.77	76.90	76.13	75.49
CLOUD HT 2	93.07	89.33	86.84	83.14	82.12	81.33	80.67	80.21	79.28	78.68	78.18	77.70
CLOUD HT 3	94.92	92.94	92.05	91.63	91.34	91.37	91.44	91.25	91.02	90.78	90.80	90.92
CLOUD COVER 1	90.23	85.20	81.77	79.71	78.36	77.25	76.31	75.69	74.92	74.01	73.46	73.00
CLOUD COVER 2	90.17	86.08	83.36	81.95	80.96	79.99	79.70	79.31	78.66	78.46	77.37	77.54
CLOUD COVER 3	94.49	92.13	91.14	90.90	90.48	90.25	90.12	89.86	89.65	89.73	89.73	89.65
VISIBILITY	93.36	89.96	87.96	86.35	84.96	83.85	82.81	81.78	80.92	80.23	79.50	78.93
PRECIPITATION	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
GUSTS	91.44	90.97	90.52	90.33	90.26	90.04	89.88	89.74	89.51	89.24	88.94	88.99
CEILING	95.80	94.25	91.58	89.42	88.01	86.92	85.97	85.03	84.26	83.54	82.72	82.13
TOTAL CLOUD AMOUNT	90.87	85.76	81.93	79.70	78.22	77.04	76.33	75.66	74.82	74.19	73.62	73.32

PERSISTENCE

CATEGORY	PROJECTION TIME											
	10	20	30	40	50	60	70	80	90	100	110	120
PRESSURE	97.89	96.44	95.12	93.80	92.51	91.25	90.02	88.83	87.61	86.43	85.28	84.20
TEMPERATURE	86.91	81.39	76.77	72.69	69.42	66.88	64.76	62.60	60.52	58.18	55.82	53.70
DEWPOINT DEPRESSION	87.78	83.77	80.51	77.72	75.69	74.37	73.37	72.41	71.22	69.45	67.52	65.67
WIND SPEED	87.26	85.68	84.69	84.06	83.55	83.17	82.74	82.40	81.98	81.60	81.13	80.76
WIND DIRECTION	68.35	61.11	56.91	54.13	51.86	50.15	48.70	47.41	46.26	45.32	44.54	43.77
CLOUD HT 1	93.52	89.34	86.01	83.86	82.14	80.79	79.58	78.50	77.41	76.47	75.58	74.77
CLOUD HT 2	93.07	89.40	86.73	85.13	83.99	83.11	82.36	81.75	81.13	80.52	80.05	79.60
CLOUD HT 3	94.97	93.03	92.04	91.64	91.33	91.16	91.05	90.86	90.57	90.38	90.25	90.19
CLOUD COVER 1	90.20	84.72	81.15	79.04	77.50	76.41	75.44	74.59	73.72	72.88	72.12	71.52
CLOUD COVER 2	90.15	85.68	83.11	81.74	80.79	80.10	79.52	79.01	78.47	78.00	77.70	77.32
CLOUD COVER 3	94.49	92.11	90.90	90.37	89.98	89.69	89.47	89.23	89.02	88.85	88.72	88.61
VISIBILITY	92.68	89.68	87.74	86.15	84.80	83.70	82.61	81.65	80.80	80.01	79.24	78.59
PRECIPITATION	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
GUSTS	91.25	90.66	90.13	89.87	89.77	89.49	89.27	89.13	88.85	88.54	88.27	88.25
CEILING	95.79	92.68	90.35	88.72	87.53	86.54	85.65	84.80	83.99	83.30	82.69	82.15
TOTAL CLOUD AMOUNT	90.86	85.06	81.47	79.37	77.85	76.65	75.60	74.80	73.97	73.29	72.68	72.11

	10	20	30	40	50	60	70	80	90	100	110	120	TOTALS
NUMBER FAVORING GEM	7	9	11	9	10	9	10	10	10	10	10	9	114
NUMBER FAVORING PERSISTENCE	1	2	2	4	3	4	3	3	3	2	3	4	34
TIES	7	4	2	2	2	2	2	2	2	3	2	2	32

Table 4. GEM and persistence Percentage Correct for each predictand element and for each 10 minute projection from 10 minutes to 120 minutes. The total number favoring each is given with a final total over all elements and projections. Precipitation is not shown because of sensor inoperability.

HEIDKE SKILL SCORE
GEM VS. PERSISTENCE

GEM

CATEGORY	PROJECTION TIME											
	10	20	30	40	50	60	70	80	90	100	110	120
PRESSURE	0.974	0.955	0.939	0.922	0.906	0.890	0.875	0.860	0.845	0.830	0.815	0.802
TEMPERATURE	0.853	0.791	0.740	0.694	0.657	0.629	0.605	0.581	0.557	0.531	0.505	0.481
DEWPOINT DEPRESSION	0.826	0.769	0.721	0.678	0.646	0.628	0.614	0.605	0.588	0.563	0.535	0.509
WIND SPEED	0.602	0.554	0.526	0.509	0.496	0.484	0.472	0.464	0.454	0.444	0.430	0.420
WIND DIRECTION	0.623	0.537	0.486	0.452	0.425	0.404	0.386	0.371	0.357	0.345	0.335	0.324
CLOUD HT 1	0.882	0.807	0.752	0.709	0.678	0.654	0.632	0.612	0.593	0.577	0.562	0.549
CLOUD HT 2	0.774	0.659	0.572	0.499	0.469	0.446	0.425	0.405	0.392	0.375	0.362	0.351
CLOUD HT 3	0.559	0.407	0.335	0.292	0.265	0.245	0.240	0.216	0.195	0.174	0.164	0.146
CLOUD COVER 1	0.818	0.724	0.660	0.621	0.595	0.574	0.556	0.541	0.527	0.512	0.500	0.491
CLOUD COVER 2	0.676	0.539	0.453	0.405	0.376	0.351	0.329	0.314	0.298	0.288	0.274	0.264
CLOUD COVER 3	0.592	0.418	0.329	0.287	0.256	0.240	0.226	0.214	0.197	0.184	0.168	0.153
VISIBILITY	0.838	0.754	0.705	0.665	0.631	0.604	0.578	0.554	0.533	0.515	0.497	0.484
PRECIPITATION	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
GUSTS	0.527	0.499	0.473	0.461	0.455	0.446	0.435	0.428	0.414	0.401	0.387	0.385
CEILING	0.895	0.857	0.790	0.737	0.703	0.676	0.653	0.630	0.613	0.595	0.577	0.563
TOTAL CLOUD AMOUNT	0.832	0.737	0.666	0.626	0.599	0.576	0.562	0.547	0.533	0.521	0.509	0.502

PERSISTENCE

CATEGORY	PROJECTION TIME											
	10	20	30	40	50	60	70	80	90	100	110	120
PRESSURE	0.974	0.955	0.939	0.922	0.906	0.890	0.875	0.860	0.845	0.830	0.815	0.802
TEMPERATURE	0.853	0.791	0.740	0.694	0.657	0.629	0.605	0.581	0.557	0.531	0.505	0.481
DEWPOINT DEPRESSION	0.826	0.769	0.722	0.682	0.653	0.634	0.619	0.606	0.588	0.563	0.535	0.509
WIND SPEED	0.601	0.551	0.520	0.500	0.485	0.473	0.460	0.449	0.436	0.424	0.410	0.398
WIND DIRECTION	0.623	0.537	0.487	0.454	0.427	0.407	0.389	0.374	0.360	0.349	0.340	0.330
CLOUD HT 1	0.882	0.806	0.745	0.706	0.675	0.651	0.629	0.610	0.591	0.574	0.558	0.544
CLOUD HT 2	0.774	0.656	0.569	0.518	0.482	0.454	0.430	0.411	0.392	0.373	0.358	0.344
CLOUD HT 3	0.558	0.390	0.305	0.272	0.245	0.232	0.223	0.210	0.185	0.170	0.158	0.153
CLOUD COVER 1	0.818	0.716	0.651	0.612	0.584	0.564	0.547	0.532	0.516	0.501	0.487	0.476
CLOUD COVER 2	0.675	0.529	0.446	0.402	0.372	0.350	0.332	0.316	0.299	0.285	0.275	0.263
CLOUD COVER 3	0.592	0.418	0.330	0.293	0.265	0.245	0.230	0.215	0.200	0.189	0.179	0.170
VISIBILITY	0.822	0.748	0.701	0.662	0.629	0.603	0.577	0.554	0.534	0.514	0.496	0.480
PRECIPITATION	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
GUSTS	0.537	0.507	0.479	0.466	0.460	0.447	0.434	0.427	0.411	0.396	0.382	0.381
CEILING	0.894	0.816	0.758	0.717	0.688	0.663	0.641	0.621	0.601	0.584	0.569	0.556
TOTAL CLOUD AMOUNT	0.832	0.725	0.660	0.621	0.594	0.573	0.554	0.539	0.525	0.513	0.502	0.492

	5	9	9	8	8	8	8	7	7	10	9	9	TOTALS
NUMBER FAVORING GEM	5	9	9	8	8	8	8	7	7	10	9	9	97
NUMBER FAVORING PERSISTENCE	1	1	4	5	5	5	5	5	4	2	3	3	43
TIES	9	5	2	2	2	2	2	3	4	3	3	3	40

Table 5. GEM and persistence Heidke skill scores for each predictand element and for each 10 minute projection from 10 minutes to 120 minutes. The total number favoring each is given with a final total over all elements and projections. Precipitation is not shown because of sensor inoperability.

THREAT SCORE
GEM VS. PERSISTENCE

GEM

CATEGORY	PROJECTION TIME											
	10	20	30	40	50	60	70	80	90	100	110	120
VISIBILITY	0.676	0.580	0.506	0.454	0.410	0.382	0.344	0.314	0.288	0.263	0.235	0.220
CEILING	0.823	0.758	0.662	0.609	0.572	0.539	0.507	0.476	0.451	0.425	0.398	0.376

PERSISTENCE

CATEGORY	PROJECTION TIME											
	10	20	30	40	50	60	70	80	90	100	110	120
VISIBILITY	0.662	0.559	0.490	0.443	0.400	0.374	0.339	0.317	0.289	0.263	0.235	0.222
CEILING	0.823	0.715	0.643	0.599	0.561	0.524	0.490	0.458	0.428	0.406	0.385	0.362

	10	20	30	40	50	60	70	80	90	100	110	120	TOTALS
NUMBER FAVORING GEM	1	2	2	2	2	2	2	1	1	1	1	1	18
NUMBER FAVORING PERSISTENCE	0	0	0	0	0	0	0	1	1	0	0	1	3
TIES	1	0	0	0	0	0	0	0	0	1	1	0	3

Table 6. GEM and persistence Threat scores for visibility and ceiling for each 10 minute projection from 10 minutes to 120 minutes. The total number favoring each is given with a final total over all elements and projections. Precipitation is not shown because of sensor inoperability.

LOG SCORE
GEM VS. PERSISTENCE

GEM

CATEGORY	PROJECTION TIME											
	10	20	30	40	50	60	70	80	90	100	110	120
VISIBILITY	3908	6116	7661	8956	10284	11709	12310	13045	14012	14913	16033	17134
CEILING	3623	5125	7669	9650	11140	12634	13253	14066	14865	15665	16881	18233

PERSISTENCE

CATEGORY	PROJECTION TIME											
	10	20	30	40	50	60	70	80	90	100	110	120
VISIBILITY	4394	6354	7853	9136	10461	11911	12527	13303	14282	15156	16281	17665
CEILING	3721	6489	8689	10170	11574	13095	13633	14337	15281	16114	17146	18520

	10	20	30	40	50	60	70	80	90	100	110	120	TOTALS
NUMBER FAVORING GEM	2	2	2	2	2	2	2	2	2	2	2	2	24
NUMBER FAVORING PERSISTENCE	0	0	0	0	0	0	0	0	0	0	0	0	0
TIES	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 7. GEM and persistence Log scores for visibility and ceiling for each 10 minute projection from 10 minutes to 120 minutes. The total number favoring each is given with a final total over all elements and projections. Precipitation is not shown because of sensor inoperability.

4. DEMONSTRATION OF GEM'S ABILITY TO FORECAST IMPORTANT METEOROLOGICAL CHANGES

Tables 8 and 9 demonstrate how well GEM is able to predict changes that occur in visibility and ceiling. For this demonstration, 3 miles of visibility and 1000 feet of ceiling were the VFR-IFR break points of interest.

- o Table 8 gives a compilation of all "VFR-to-IFR" changes. Visibility is at the top and ceiling at the bottom.

VFR for visibility is ≥ 3 miles (henceforth denoted as a 1).

IFR for visibility is < 3 miles (henceforth denoted as a 0).

VFR for ceiling is ≥ 1000 feet (henceforth denoted as a 1).

IFR for ceiling is < 1000 feet (henceforth denoted as a 0).

An explanation of the table entries is as follows:

- The column labeled PGO stands for persistence (P), GEM (G), and verifying observation (O).
- Subsequent column labels denote time projections 10M, 20M, ..., 120M.
- The row labeled 000 gives the PGO combination $P = 0$ (IFR), $G = 0$ (IFR), and $O = 0$ (IFR) with the number of times each occurred at 10M, 20M, ..., 120M, respectively.
- For example, in visibility there were 15,367 times in the 361,136 sample that this combination was observed to occur at 20 minutes from forecast time.
- The rows which denote IFR-to-VFR visibility changes are those where PGO is 001 and 011 amounting to 3442 and 1345 or 4787 (total), respectively. GEM forecasts a change 697 + 1345 or 2042 times. Under these circumstances:

Probability of GEM hitting change (POHC) = $1345/2042 = 65.9\%$.

Probability of GEM detecting change (PODC) = $1345/4787 = 28.1\%$.

False alarm rate of GEM predicting change (FARC) = $1.0 - \text{POHC} = 34.1\%$.

- The rows which denote VFR-to-IFR visibility changes are those where PGO is 100 and 110 amounting to 253 and 4428 (4681 changes), respectively, for the 20 minute projection time. GEM forecast a change 253 + 315 or 568 times. Under these circumstance:

Probability of GEM hitting change (POHC) = $253/568 = 44.5\%$.

Probability of GEM detecting change (PODC) = $253/4681 = 5.4\%$.

False alarm rate of predicting change (FARC) = $1.0 - \text{POHC} = 55.5\%$.

OBSERVATIONAL FREQUENCY COUNTS

VISIBILITY	PROJECTION TIME (MINUTES)												
	PGO	10	20	30	40	50	60	70	80	90	100	110	120
0 000		17434	15367	14306	13425	12878	12570	11551	10804	10415	9965	9746	9774
1 001		1865	3442	4459	5313	6154	7070	7425	7851	8312	8705	9238	9894
2 010		691	697	673	635	637	636	641	611	615	572	575	582
3 011		1538	1345	1376	1376	1399	1484	1417	1376	1337	1391	1382	1445
4 100		1369	253	136	65	51	12	74	103	61	90	72	154
5 101		1479	315	224	151	156	99	147	189	146	274	230	315
6 110		1902	4428	5490	6347	7187	8191	8380	8758	9269	9612	10158	10761
7 111		343524	325289	333763	331688	336143	346547	332841	325431	324828	323020	327879	338637
TOTAL		369802	361136	360427	359000	364605	376609	362476	355123	354983	353637	359280	371562

GIVEN PERSISTENCE IS IFR

POHC	0.690	0.659	0.672	0.684	0.687	0.700	0.689	0.693	0.685	0.709	0.706	0.713
PODC	0.452	0.281	0.236	0.206	0.185	0.173	0.160	0.149	0.139	0.138	0.130	0.127
FARC	0.310	0.341	0.328	0.316	0.313	0.300	0.311	0.307	0.315	0.291	0.294	0.287

GIVEN PERSISTENCE IS VFR

POHC	0.481	0.445	0.378	0.301	0.246	0.108	0.335	0.353	0.295	0.263	0.238	0.328
PODC	0.419	0.054	0.024	0.010	0.007	0.001	0.009	0.012	0.007	0.010	0.007	0.014
FARC	0.519	0.555	0.622	0.699	0.754	0.892	0.665	0.647	0.705	0.737	0.762	0.672

CEILING

LING	PROJECTION TIME (MINUTES)												
	PGO	10	20	30	40	50	60	70	80	90	100	110	120
0 000		19886	17800	17018	16532	16356	16501	15623	15040	14624	14218	14119	14294
1 001		1305	1093	1906	2740	3243	3734	4031	4350	4639	4836	5135	5668
2 010		0	653	615	508	526	556	477	411	476	496	524	535
3 011		0	1181	1173	903	917	966	820	730	808	941	1045	1067
4 100		0	1104	1082	921	956	940	882	810	861	808	843	843
5 101		0	636	773	825	972	1017	991	1033	1029	1018	1229	1168
6 110		1331	1224	2020	2710	3186	3745	3994	4325	4628	4996	5394	5943
7 111		347280	337445	335840	333861	338449	349150	335658	328424	327918	326324	330991	342044
TOTAL		369802	361136	360427	359000	364605	376609	362476	355123	354983	353637	359280	371562

GIVEN PERSISTENCE IS IFR

POHC	**	0.644	0.656	0.640	0.635	0.635	0.632	0.640	0.629	0.655	0.666	0.666
PODC	0.000	0.519	0.381	0.248	0.220	0.206	0.169	0.144	0.148	0.163	0.169	0.158
FARC	**	0.356	0.344	0.360	0.365	0.365	0.368	0.360	0.371	0.345	0.334	0.334

GIVEN PERSISTENCE IS VFR

POHC	**	0.634	0.583	0.527	0.496	0.480	0.471	0.440	0.456	0.442	0.407	0.419
PODC	0.000	0.474	0.349	0.254	0.231	0.201	0.181	0.158	0.157	0.139	0.135	0.124
FARC	**	0.366	0.417	0.473	0.504	0.520	0.529	0.560	0.544	0.558	0.593	0.581

MET GEM VS PERS	737	1582	1482	1146	1032	1094	937	775	801	878	784	909
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Table 8. Frequency counts for visibility and ceiling VFR to IFR changes at each 10 minute interval from 10 minutes to 120 minutes with counts on GEM's prediction of change or prediction of no change. Shown also are the counts of persistence under each observed and forecast change. The column labeled PGO denotes persistence (P), GEM (G), and observation (O) with a 0 for IFR and a 1 for VFR. For example, the first row labeled 000 denotes that at 10M there were 17434 times when persistence, GEM, and the verifying observation were IFR in visibility.

OBSERVATIONAL FREQUENCY COUNTS

VISIBILITY		PROJECTION TIME (MINUTES)											
	PGO	10	20	30	40	50	60	70	80	90	100	110	120
0	000	2814	2402	2187	2029	1919	1885	1688	1526	1434	1331	1227	1122
1	001	393	623	735	787	864	862	865	841	816	821	840	609
2	010	75	80	79	77	68	63	64	122	110	99	95	178
3	011	303	228	207	191	154	157	153	151	162	142	129	307
4	100	179	19	0	9	0	4	4	1	2	4	8	12
5	101	273	41	1	36	0	38	39	19	20	20	31	49
6	110	418	698	785	799	867	905	906	929	926	860	844	815
7	111	12979	11276	10312	9497	9006	8656	7832	7215	6945	6688	6572	6682
TOTAL		17434	15367	14306	13425	12978	12570	11551	10804	10415	9965	9746	9774

GIVEN PERSISTENCE IS LOW IFR

POHC	0.802	0.740	0.724	0.713	0.694	0.714	0.705	0.553	0.596	0.589	0.576	0.633
PODC	0.435	0.268	0.220	0.195	0.151	0.154	0.150	0.152	0.166	0.147	0.133	0.335
FARC	0.198	0.260	0.276	0.287	0.306	0.286	0.295	0.447	0.404	0.411	0.424	0.367

GIVEN PERSISTENCE IS IFR

POHC	0.396	0.317	0.000	0.200	**	0.095	0.093	0.050	0.091	0.167	0.205	0.197
PODC	0.300	0.026	0.000	0.011	0.000	0.004	0.004	0.001	0.002	0.005	0.009	0.015
FARC	0.604	0.683	1.000	0.800	**	0.905	0.907	0.950	0.909	0.833	0.795	0.803

CEILING

		PROJECTION TIME (MINUTES)											
	PGO	10	20	30	40	50	60	70	80	90	100	110	120
0	000	10078	8682	7815	7746	7566	7500	7149	6688	6397	6148	6032	5958
1	001	660	628	809	1241	1420	1619	1916	2005	2106	2121	2240	2351
2	010	0	262	552	268	267	266	26	24	24	20	2	12
3	011	0	404	547	317	301	281	30	29	21	23	1	18
4	100	0	441	490	325	311	270	240	369	374	236	238	240
5	101	0	165	228	152	160	140	138	228	241	144	141	137
6	110	672	549	714	993	1138	1386	1529	1548	1708	1931	2063	2263
7	111	8476	6669	5863	5490	5193	5039	4595	4149	3753	3595	3402	3215
TOTAL		19866	17800	17018	16532	16356	16501	15623	15040	14624	14218	14119	14294

GIVEN PERSISTENCE IS LOW IFR

POHC	**	0.607	0.498	0.542	0.530	0.514	0.536	0.547	0.467	0.535	0.333	0.600
PODC	0.000	0.391	0.403	0.203	0.175	0.148	0.015	0.014	0.010	0.011	0.000	0.008
FARC	**	0.393	0.502	0.458	0.470	0.466	0.464	0.453	0.530	0.465	0.667	0.400

GIVEN PERSISTENCE IS IFR

POHC	**	0.728	0.682	0.681	0.660	0.659	0.635	0.618	0.608	0.621	0.613	0.637
PODC	0.000	0.445	0.407	0.247	0.215	0.163	0.136	0.192	0.180	0.109	0.103	0.096
FARC	**	0.272	0.318	0.319	0.340	0.341	0.365	0.382	0.392	0.379	0.372	0.363

NET GEM VS PERS	134	544	384	309	271	205	160	157	164	122	107	201
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Table 9. Frequency counts for visibility and ceiling IFR to LIFR changes at each 10 minute interval from 10 minutes to 120 minutes with counts on GEM's prediction of change or prediction of no change. Shown also are the counts of persistence under each observed and forecast change. The column labeled PGO denotes persistence (P), GEM (G), and observation (O) with a 0 for LIFR and a 1 for IFR. For example, the first row labeled 000 denotes that at 10M there were 2814 times when persistence, GEM, and the verifying observation were LIFR in visibility.

- Similar quantities are shown for ceiling for the 20 minute projection time namely:

For IFR-to-VFR changes, POHC = 64.4%, PODC = 51.9%, and FARC = 35.6%.

For VFR-to-IFR changes, POHC = 63.4%, PODC = 47.4%, and FARC = 36.6%.

- The bottom row of the table shows the sum over both visibility and ceiling of the 011 and 100 (times when GEM correctly predicted change leaving persistence incorrect) minus 010 and 101 (times when GEM incorrectly predicted change leaving persistence correct). Thus: Net = $((1345 + 253) + (1181 + 1104)) - ((697 + 315) + (653 + 636)) = 1582$.
- o Table 9 gives a compilation of all IFR-to-low IFR (LIFR) changes. Again visibility is at the top and ceiling is at the bottom. Under these circumstances:

IFR for visibility is 1 to < 3 miles (henceforth denoted as a 1).

LIFR for visibility is < 1 mile (henceforth denoted as a 0).

IFR for ceiling is 500 to < 1000 feet (henceforth denoted as a 1).

LIFR for ceiling is < 500 feet (henceforth denoted as a 0).

The explanation for the LIFR-to-IFR is similar to that made under VFR-to-IFR above.

In predicting VFR-to-IFR changes, GEM has achieved a net that is positive over all projections. Likewise, in IFR-to-LIFR changes GEM has all positive net values over persistence at all 10 minute projection from 10 minutes out to 120 minutes. A summarizing statement about GEM's accomplishments in predicting change is this:

Of all the LIFR to IFR and IFR to LIFR changes that occurred in visibility and ceiling in a 20 minute period (3590), GEM correctly predicted (1092) or over 30% of the changes, with a very respectable false alarm rate of 33.4% (548/1640).

This has been a solid demonstration of GEM's operational usefulness at predicting changes especially for the key aviation elements of visibility and ceiling at very short range.

5. FORECASTING EXAMPLES

Out of the approximately 350,000 forecasts performed in this verification study, 10 forecast situations are provided as examples of how a GEM forecast appears in "live" situations. The 10 illustrative examples used to demonstrate GEM's abilities at predicting VFR-IFR changes were selected as follows:

Four files were prepared which contained all of the cases in the test sample that had a VRF-IFR or IFR-VFR change in a 20 minute period. Two of the files were for such changes in visibility and two for such changes in ceiling (about 12,000 cases). Record numbers ending in even hundreds were selected from each of these files in a fashion so as to give a sampling from each of the four types of change conditions (about 120 cases). An arbitrary set of 10 cases was chosen which depicted GEM as having some skill at predicting the changes that occurred.

- o Table 10, August 21, 1986 1311 GMT, shows a situation where the visibility improved in 10 minutes and was successfully predicted.
- o Table 11, September 1, 1986 0857 GMT, again shows GEM's success at forecasting improving visibility conditions and maintaining this over the period.
- o Table 12, December 2, 1986 1330 GMT, shows a similar ability for predicting improving and then worsening conditions with some success.
- o Table 13, May 15, 1986 0517 GMT, shows a case where GEM anticipated worsening conditions along with success at predicting lowering ceiling conditions.
- o Table 14, August 6, 1988 0738 GMT, again shows GEM's ability to predict correctly a worsening visibility situation and then a later improving condition.
- o Table 15, August 21, 1986 1417 GMT, shows another situation where a lowering visibility condition was correctly anticipated by GEM.
- o Table 16, April 12, 1986 0630 GMT, demonstrates GEM's ability to anticipate improving and then worsening visibility conditions correctly.
- o Table 17, August 16, 1986 1355 GMT, shows GEM predicting an improving ceiling situation successfully.
- o Table 18, September 2, 1986 1006 GMT, shows a successful lowering ceiling forecast.
- o Table 19, October 27, 1986 0801 GMT, has GEM demonstrating a skill at predicting worsening ceiling conditions further out in the period.

Obviously not all forecasts were perfect. This fact is borne out by studying the verification results. However, these are typical of the kind of situations where GEM successfully predicts change.

A demonstration was prepared which showed that GEM forecasts could be made in the time frame stipulated as one of the conditions in the scientific evaluation (reference page C-2 of the Appendix).

GEM FORECAST

TIME	1311				GMT	AUGUST 21 1986			
	CLOUDS				VIS/WX	PRESS/TEMP/DP/	WD	/	WS
1311	2 SCT	C 5 BKN	10 BKN		1	30.05 /70/69/046-090			5
1321	2 SCT	C 5 BKN	10 BKN		3	30.05 /70/69/046-090			5
1331	2 SCT	C 5 BKN	10 BKN		3	30.05 /70/69/046-090			5
1341	2 SCT	C 5 BKN	10 BKN		3	30.05 /70/69/046-090			5
1351	2 SCT	C 5 BKN	10 BKN		3	30.05 /70/69/046-090			5
1401	2 SCT	C 5 BKN			3	30.05 /70/69/046-090			5
1411	2 SCT	C 5 BKN			3	30.05 /70/69/046-090			5
1421	2 SCT	C 5 BKN			3	30.05 /70/69/046-090			5
1431	2 SCT	C 5 BKN			3	30.05 /70/69/046-090			5
1441	2 SCT	C 5 BKN			3	30.05 /70/69/046-090			5
1451	C 5 BKN	5 BKN			3	30.05 /70/69/046-090			5
1501	C 5 BKN	5 BKN			3	30.05 /70/69/046-090			5
1511	2 SCT	C 5 BKN			3	30.05 /70/69/046-090			5
1321	2 SCT	C 5 BKN	10 BKN		3	30.05 /70/69/046-090			5
1331	2 SCT	C 5 BKN			3	30.05 /70/69/046-090			5
1341	5 SCT	C 5 BKN			3	30.05 /70/69/046-090			5
1351	5 SCT	C 5 BKN			3	30.05 /70/65/046-090			5
1401	5 SCT	C 5 BKN			3	30.05 /70/69/046-090			5
1411	C 5 BKN				3	30.05 /70/69/001-045			5
1421	C 5 BKN	5 BKN			1	30.05 /70/69/001-045			5
1431	C 5 BKN				1	30.05 /70/69/046-090			5
1441	C 5 BKN	5 BKN			1	30.05 /70/69/001-045			5
1451	2 SCT	C 5 BKN			3	30.05 /70/69/001-045			5
1501	C 2 BKN	5 BKN			3	30.05 /70/69/001-045			5
1511	C 2 BKN	5 BKN			3	30.05 /70/69/001-045			5

Table 10. August 21, 1986 1311 GMT, shows a situation where the visibility improved in 10 minutes and was successfully predicted.

GEM FORECAST

TIME	CLOUDS	0857 GMT VIS/WX	SEPTEMBER 1 1986 PRESS/TEMP/DP/ WD / WS
0857	CLR BLW 6000	1	30.19 /52/47/046-090 5
0907	CLR BLW 6000	3	30.19 /52/47/046-090 5
0917	CLR BLW 6000	3	30.19 /52/47/046-090 5
0927	CLR BLW 6000	3	30.19 /52/47/046-090 5
0937	CLR BLW 6000	3	30.19 /52/47/046-090 5
0947	CLR BLW 6000	3	30.19 /52/47/046-090 5
0957	CLR BLW 6000	3	30.19 /52/47/046-090 5
1007	CLR BLW 6000	3	30.19 /52/47/046-090 5
1017	CLR BLW 6000	3	30.19 /52/47/046-090 5
1027	CLR BLW 6000	3	30.19 /52/47/046-090 5
1037	CLR BLW 6000	3	30.19 /52/47/046-090 5
1047	CLR BLW 6000	3	30.19 /52/47/046-090 5
1057	CLR BLW 6000	3	30.19 /52/47/046-090 5
0907	CLR BLW 6000	3	30.19 /52/47/046-090 5
0917	CLR BLW 6000	3	30.19 /52/47/046-090 5
0927	CLR BLW 6000	3	30.19 /52/47/316-360 5
0937	CLR BLW 6000	3	30.19 /52/51/316-360 5
0947	CLR BLW 6000	3	30.19 /52/51/316-360 5
0957	CLR BLW 6000	3	30.19 /52/47/316-360 5
1007	CLR BLW 6000	3	30.19 /52/47/091-135 5
1017	CLR BLW 6000	3	30.19 /52/47/091-135 5
1027	CLR BLW 6000	3	30.19 /57/52/000-000 0
1037	CLR BLW 6000	3	30.19 /57/52/000-000 0
1047	CLR BLW 6000	3	30.19 /52/47/136-180 5
1057	CLR BLW 6000	3	30.19 /57/52/136-180 5

Table 11. September 1, 1986 0857 GMT, again shows GEM's success at forecasting improving visibility conditions and maintaining this over the period.

GEM FORECAST

TIME	CLOUDS	1330	GMT VIS/WX	DECEMBER 2 1986 PRESS/TEMP/DP/ WD / WS	
1330	C 5 OVC		1	30.19 /42/37/091-135	5 G11-20
1340	C 5 OVC		3	30.19 /42/37/091-135	5
1350	C 5 OVC		3	30.19 /42/37/091-135	5
1400	C 5 OVC		3	30.19 /42/37/091-135	5
1410	C 5 OVC		3	30.19 /42/37/091-135	5
1420	C 5 OVC		3	30.19 /42/37/091-135	5
1430	C 5 OVC		3	30.19 /42/37/091-135	5
1440	C 5 OVC		3	30.19 /42/37/091-135	5
1450	C 5 OVC		3	30.19 /42/37/091-135	5
1500	C 5 OVC		3	30.19 /42/37/091-135	5
1510	C 5 OVC		3	30.19 /42/37/091-135	5
1520	C 5 OVC		3	30.19 /42/37/091-135	5
1530	C 5 OVC		1	30.19 /42/37/091-135	5
1340	C 5 OVC		3	30.19 /42/37/091-135	12
1350	C 5 OVC		3	30.19 /42/37/091-135	5
1400	C 5 OVC		3	30.19 /42/37/091-135	12 G11-20
1410	C 5 OVC		3	30.19 /42/37/091-135	12
1420	C 5 OVC		3	30.19 /42/37/091-135	12
1430	C 5 OVC		3	30.19 /42/37/091-135	12
1440	C 5 OVC		1	30.19 /47/42/091-135	5
1450	C 5 BKN 10 OVC		1	30.19 /47/42/091-135	12
1500	C 5 BKN 10 BKN 30 OVC		1	30.19 /47/42/091-135	12 G11-20
1510	C 5 BKN 10 OVC		1	30.19 /47/42/091-135	12 G11-20
1520	C 5 BKN 10 OVC		1	30.19 /47/42/091-135	12 G11-20
1530	5 SCT C 5 BKN 30 OVC		1	30.19 /47/42/091-135	12 G11-20

Table 12. December 2, 1986 1330 GMT, shows a similar ability for predicting improving and then worsening conditions with some success.

GEM FORECAST

TIME	CLOUDS		0517	GMT	MAY 15 1986			WD	/	WS
				VIS/WX	PRESS	TEMP/DP/				
0517	2 SCT	C 5 OVC		3	30.19	/52/51/181-225			5	
0527	2 SCT	C 5 OVC		1	30.19	/52/51/181-225			5	
0537	C 2 BKN	5 OVC		1	30.19	/52/51/181-225			5	
0547	C 2 BKN	5 OVC		1	30.19	/52/51/181-225			5	
0557	C 2 BKN	5 OVC		1	30.19	/52/51/181-225			5	
0607	C 2 BKN	5 OVC		1	30.19	/52/51/181-225			5	
0617	C 2 BKN	5 OVC		3	30.19	/52/51/181-225			5	
0627	C 2 BKN	5 OVC		1	30.19	/52/51/181-225			5	
0637	C 2 BKN	5 OVC		1	30.19	/52/51/181-225			5	
0647	C 2 BKN	5 OVC		1	30.19	/52/51/181-225			5	
0657	C 2 BKN	5 OVC		1	30.19	/52/51/181-225			5	
0707	C 5 BKN	5 OVC		1	30.19	/52/51/181-225			5	
0717	C 2 OVC	5 OVC		1	30.19	/52/51/181-225			5	
0527	2 SCT	C 5 OVC		1	30.19	/52/51/181-225			5	
0537	C 2 BKN	5 OVC		1	30.19	/57/52/136-180			5	
0547	C 2 BKN	5 OVC		1	30.19	/57/52/136-180			5	
0557	C 2 BKN	5 OVC		1	30.19	/57/52/181-225			5	
0607	C 2 BKN	5 OVC		1	30.19	/57/52/181-225			5	
0617	C 2 BKN	5 OVC		1	30.19	/57/52/136-180			5	
0627	C 2 BKN	5 OVC		3	30.19	/57/52/136-180			5	
0637	C 2 BKN	5 OVC		1	30.19	/57/52/181-225			5	
0647	C 2 BKN	5 OVC		1	30.19	/57/52/181-225			5	
0657	C 0 BKN	5 OVC		1	30.19	/57/52/181-225			5	
0707	0 SCT	C 5 OVC		1	30.19	/57/52/181-225			5	
0717	0 SCT	C 5 OVC		1	30.19	/57/52/181-225			5	

Table 13. May 15, 1986 0517 GMT, shows a case where GEM anticipated worsening conditions along with success at predicting lowering ceiling conditions.

GEM FORECAST

TIME	CLOUDS	0738	GMT VIS/WX	AUGUST 6 1986 PRESS/TEMP/DP/ WD / WS
0738	CLR BLW 6000		3	30.05 /62/61/316-360 5
0748	CLR BLW 6000		1	30.05 /62/61/316-360 5
0758	CLR BLW 6000		3	30.05 /62/61/316-360 5
0808	CLR BLW 6000		3	30.05 /62/61/316-360 5
0818	CLR BLW 6000		3	30.05 /62/61/316-360 5
0828	CLR BLW 6000		3	30.05 /62/61/316-360 5
0838	CLR BLW 6000		3	30.05 /62/61/316-360 5
0848	CLR BLW 6000		3	30.05 /62/61/316-360 5
0858	CLR BLW 6000		3	30.05 /62/61/316-360 5
0908	CLR BLW 6000		3	30.05 /62/61/316-360 5
0918	CLR BLW 6000		3	30.05 /62/61/316-360 5
0928	CLR BLW 6000		3	30.05 /62/61/316-360 5
0938	CLR BLW 6000		3	30.05 /62/61/316-360 5
0748	CLR BLW 6000		1	30.05 /62/61/316-360 5
0758	CLR BLW 6000		1	30.05 /70/65/226-270 5
0808	CLR BLW 6000		1	30.05 /70/69/226-270 5
0818	CLR BLW 6000		3	30.05 /70/65/271-315 5
0828	CLR BLW 6000		3	30.05 /70/65/226-270 5
0838	10 SCT 10 SCT		3	30.05 /62/61/226-270 5
0848	10 SCT 10 SCT		1	30.05 /62/61/181-225 5
0858	10 SCT 30 SCT		3	30.05 /62/61/000-000 0
0908	10 SCT 10 SCT		3	30.05 /70/65/181-225 5
0918	10 SCT 10 SCT 10 SCT		3	30.05 /62/61/181-225 5
0928	10 SCT 10 SCT 30 SCT		3	30.05 /70/65/136-180 5
0938	10 SCT 10 SCT		3	30.05 /70/65/136-180 5

Table 14. August 6, 1988 0738 GMT, again shows GEM's ability to predict correctly a worsening visibility situation and then a later improving condition.

GEM FORECAST

TIME	1417		GMT	AUGUST 21 1986		
	CLOUDS		VIS/WX	PRESS/TEMP/DP/	WD /	WS
1417	C 5 BKN	5 BKN	3	30.05 /70/65/046-090		5
1427	C 5 BKN	5 BKN	1	30.05 /70/65/046-090		5
1437	C 5 BKN	5 BKN	3	30.05 /70/65/046-090		5
1447	C 5 BKN	5 BKN	3	30.05 /70/65/046-090		5
1457	C 5 BKN	5 OVC	3	30.05 /70/65/046-090		5
1507	C 5 BKN	5 OVC	3	30.05 /70/65/046-090		5
1517	C 5 BKN	5 OVC	3	30.05 /70/65/046-090		5
1527	C 5 BKN	5 OVC	3	30.05 /70/65/046-090		5
1537	C 5 BKN	5 OVC	3	30.05 /70/65/046-090		5
1547	C 5 BKN	5 OVC	3	30.05 /70/65/046-090		5
1557	C 5 BKN	5 OVC	3	30.05 /70/65/046-090		5
1607	C 5 BKN	5 OVC	3	30.05 /70/65/046-090		5
1617	5 SCT	C 5 OVC	3	30.05 /70/65/046-090		5
1427	C 5 BKN	5 BKN	1	30.05 /70/69/046-090		5
1437	C 5 BKN	5 BKN	1	30.05 /70/69/046-090		5
1447	C 5 BKN	5 BKN	3	30.05 /70/69/046-090		5
1457	C 5 BKN		3	30.05 /70/69/001-045		5
1507	C 2 BKN	5 BKN	3	30.05 /70/69/001-045		5
1517	C 2 BKN	5 BKN	3	30.05 /70/69/046-090		5
1527	C 2 BKN		1	30.05 /70/69/001-045		5
1537	C 2 BKN	5 BKN	1	30.05 /70/69/001-045		5
1547	C 2 BKN	5 BKN	1	30.05 /70/69/001-045		5
1557	C 2 BKN	5 BKN	1	30.05 /70/69/001-045		5
1607	C 2 BKN		1	30.05 /70/65/001-045		5
1617	C 2 BKN		1	30.05 /70/65/001-045		5

Table 15. August 21, 1986 1417 GMT, shows another situation where a lowering visibility condition was correctly anticipated by GEM.

GEM FORECAST

TIME	CLOUDS	0630 GMT VIS/WX	APRIL 12 1987 PRESS/TEMP/DP/ WD / WS
0630	CLR BLW 6000	3	29.90 /37/26/181-225 5
0640	CLR BLW 6000	5	29.90 /37/26/181-225 5
0650	CLR BLW 6000	5	29.90 /37/26/181-225 5
0700	CLR BLW 6000	5	29.90 /37/26/181-225 5
0710	CLR BLW 6000	5	29.90 /37/26/181-225 5
0720	CLR BLW 6000	3	29.90 /37/26/181-225 5
0730	CLR BLW 6000	3	29.90 /37/26/181-225 5
0740	CLR BLW 6000	3	29.90 /37/26/181-225 5
0750	CLR BLW 6000	3	29.90 /37/26/181-225 5
0800	CLR BLW 6000	3	29.90 /37/26/181-225 5
0810	CLR BLW 6000	3	29.90 /37/26/181-225 5
0820	CLR BLW 6000	3	29.90 /37/26/181-225 5
0830	CLR BLW 6000	3	29.90 /37/26/181-225 5
0640	CLR BLW 6000	5	29.90 /37/26/181-225 5
0650	CLR BLW 6000	1	29.90 /37/26/271-315 5
0700	CLR BLW 6000	3	29.90 /37/26/271-315 5
0710	CLR BLW 6000	3	29.90 /37/26/271-315 5
0720	CLR BLW 6000	3	29.90 /37/26/000-000 0
0730	CLR BLW 6000	5	29.90 /37/26/271-315 5
0740	CLR BLW 6000	3	29.90 /37/26/000-000 0
0750	CLR BLW 6000	5	29.90 /37/26/000-000 0
0800	CLR BLW 6000	5	29.90 /37/26/316-360 5
0810	CLR BLW 6000	3	29.75 /37/26/046-090 5
0820	CLR BLW 6000	3	29.90 /37/26/001-045 5
0830	CLR BLW 6000	3	29.75 /37/26/046-090 5

Table 16. April 12, 1986 0630 GMT, demonstrates GEM's ability to anticipate improving and then worsening visibility conditions correctly.

GEM FORECAST

TIME	CLOUDS	1355	GMT VIS/WX	AUGUST 16 1986 PRESS/TEMP/DP/ WD / WS
1355	C 5 BKN		7+	29.90 /80/75/226-270 5
1405	C 5 BKN		7+	29.90 /80/75/226-270 5
1415	5 SCT		7+	29.90 /80/75/226-270 5
1425	5 SCT		7+	29.90 /80/75/226-270 5
1435	5 SCT		7+	29.90 /80/75/226-270 5
1445	5 SCT		7+	29.90 /80/75/226-270 5
1455	5 SCT		7+	29.90 /80/75/226-270 5
1505	5 SCT		7+	29.90 /80/75/226-270 5
1515	5 SCT		7+	29.90 /80/75/226-270 5
1525	5 SCT		7+	29.90 /80/75/226-270 5
1535	5 SCT		7+	29.90 /80/75/226-270 5
1545	5 SCT		7+	29.90 /80/75/226-270 5
1555	5 SCT		7+	29.90 /80/75/226-270 5
1405	C 5 BKN	10 BKN	7+	29.90 /80/75/181-225 5
1415	10 SCT		7+	29.90 /80/75/181-225 5
1425	5 SCT	10 SCT	7+	29.90 /80/75/181-225 5
1435	10 SCT		7+	29.90 /80/75/226-270 5
1445	10 SCT		7+	29.90 /80/75/226-270 5
1455	10 SCT		7+	29.90 /80/75/226-270 5
1505	10 SCT		7+	29.90 /80/75/226-270 5
1515	10 SCT		7+	29.90 /80/75/181-225 5
1525	10 SCT		7+	29.90 /80/75/226-270 5
1535	10 SCT		7+	29.90 /80/75/181-225 5
1545	10 SCT	10 SCT	7+	29.90 /80/75/181-225 5
1555	C10 BKN		7+	29.90 /80/75/181-225 5

Table 17. August 16, 1986 1355 GMT, shows GEM predicting an improving ceiling situation successfully.

GEM FORECAST

TIME	CLOUDS	1006	GMT VIS/WX	SEPTEMBER 2 1986 PRESS/TEMP/DP/ WD / WS
1006	2 SCT		3	30.19 /57/56/000-000 0
1016	2 SCT		3	30.19 /57/56/000-000 0
1026	2 SCT		3	30.19 /57/56/000-000 0
1036	2 SCT		3	30.19 /57/56/000-000 0
1046	C 2 OVC		3	30.19 /57/56/000-000 0
1056	C 2 OVC		3	30.19 /57/56/000-000 0
1106	C 2 OVC		3	30.19 /57/56/000-000 0
1116	C 2 OVC		3	30.19 /57/56/000-000 0
1126	C 2 OVC		3	30.19 /57/56/000-000 0
1136	C 2 OVC		3	30.19 /57/56/001-045 5
1146	C 2 OVC		3	30.19 /57/56/000-000 0
1156	C 2 OVC		3	30.19 /57/56/000-000 0
1206	2 SCT		3	30.19 /57/56/000-000 0
1016	C 2 BKN		3	30.19 /57/56/000-000 0
1026	C 2 OVC		3	30.19 /57/56/091-135 5
1036	C 2 OVC		3	30.19 /57/56/000-000 0
1046	C 2 OVC		3	30.19 /57/56/000-000 0
1056	C 2 OVC		5	30.19 /62/57/000-000 0
1106	C 2 OVC		1	30.19 /62/57/000-000 0
1116	C 2 OVC		3	30.19 /62/57/091-135 5
1126	C 2 OVC		3	30.19 /57/56/000-000 0
1136	C 2 OVC		1	30.19 /57/56/000-000 0
1146	C 2 OVC		1	30.19 /57/56/000-000 0
1156	C 2 OVC		3	30.19 /57/56/000-000 0
1206	C 2 OVC		3	30.19 /57/56/000-000 0

Table 18. September 2, 1986 1006 GMT, shows a successful lowering ceiling forecast.

GEM FORECAST

TIME	CLOUDS		0801	GMT VIS/WX	OCTOBER 27 1986 PRESS/TEMP/DP/ WD / WS
0801	2 SCT	C10 OVC		1	29.90 /57/52/271-315 5
0811	2 SCT	C10 OVC		1	29.90 /57/52/271-315 5
0821	2 SCT	C10 OVC		1	29.90 /57/52/271-315 5
0831	C 2 OVC	10 OVC		1	29.90 /57/52/271-315 5
0841	C 2 OVC	10 OVC		1	29.90 /57/52/271-315 5
0851	C 2 OVC	10 OVC		1	29.90 /57/52/271-315 5
0901	C 2 OVC	10 OVC		1	29.90 /57/52/271-315 5
0911	C 2 OVC	10 OVC		1	29.90 /57/52/271-315 5
0921	C 2 OVC	10 OVC		1	29.90 /57/52/271-315 5
0931	C 2 OVC	10 OVC		1	29.90 /57/52/271-315 5
0941	C 2 OVC	10 OVC		1	29.90 /57/52/271-315 5
0951	C 2 OVC	10 OVC		1	29.90 /57/52/271-315 5
1001	C 2 BKN			1	29.90 /57/52/271-315 5
0811	2 SCT	C10 OVC		1	29.90 /57/52/271-315 5
0821	C 2 BKN	10 OVC		1	29.90 /52/51/316-360 5
0831	2 SCT	C10 OVC		1	29.90 /57/52/316-360 5
0841	2 SCT	C10 OVC		1	29.90 /57/52/001-045 5
0851	C10 OVC			1	29.90 /57/52/316-360 5
0901	2 SCT	C10 OVC		1	29.90 /57/52/001-045 5
0911	2 SCT	C10 OVC		1	29.90 /57/52/316-360 5
0921	C 2 BKN	10 OVC		1	29.90 /57/56/316-360 5
0931	C 2 OVC			1	29.90 /57/56/316-360 5
0941	C 2 OVC			1	29.90 /52/51/316-360 5
0951		W7X		1	29.90 /57/56/000-000 0
1001		W7X		1	29.90 /57/52/316-360 5

Table 19. October 27, 1986 0801 GMT, has GEM demonstrating a skill at predicting worsening ceiling conditions further out in the period.

6. BOOLEAN PREDICTOR APPROACH

Single station forecasting is challenging due to the limited number of available predictors. A source of potential predictability lies in the interaction among pairs of the available predictors. When and if such interactions are useful as predictors it could be due to synergism between the predictor pairs or just an effort by the regression analysis to account for nonadditivity between the two interacting predictor pairs. For whatever the reason we felt obliged to make an effort at capturing such information. Testing all possible pairs of predictors is quite impractical. We chose to employ a method developed nearly 20 years ago by Miller (1969) called SLAM for screening lattice algorithm.

SLAM first screens predictors as in a REEP approach with an F test criterion to select only those non-boolean predictors that were significant. It then seeks to find boolean pairs of predictors from among those screened out by REEP. It tests all possible logical "ands" between pairs and selects the boolean combination whose pair adds most to the reduction of variance over and above that contained in the original REEP selected set. Further selections are made in this fashion until the point is reached where the next boolean pair does not add significantly to the reduction of variance through an F test.

Application of SLAM has yielded results which are better on test sample data from those achieved without interactive boolean predictors. Because of the extra burden SLAM puts on our microcomputers, we were limited in the size of the experiments performed. For now, only 10 minute and 60 minute projections were tested. The results obtained using boolean + non-boolean predictors along with the corresponding results obtained without boolean predictors are:

Aggregating the Brier, Percent Correct, Heidke, Threat, and Log scores gives

10 Minute Forecasts		60 Minute Forecasts	
Favoring Boolean + Non-Boolean	Favoring Non-Boolean	Favoring Boolean + Non-Boolean	Favoring Non-Boolean
35	3	28	19

For example, results from boolean + non-boolean 10 minute GEM equation forecasts of ceiling on the test sample data are shown in Table 20 while the corresponding non-boolean results are shown in Table 21.

Please note that the strictly non-boolean equations used above contained the same number of non-boolean predictors as there were in the boolean + non-boolean equations--not the 30 that were utilized in the regular AWOS-GEM's equations whose verifications appear in Appendix C. This was the only fair way to test the real contribution made by the booleans over and above non-booleans alone. Note also that there were 1194 more hits (correct predictions) by boolean + non-boolean predictors than by non-boolean predictors alone. Before introducing boolean predictors, GEM had only 42 more hits than persistence while the boolean + non-boolean predictors has 1530 more hits than persistence.

Table 20. Test sample results using boolean + non-boolean AWOS-GEM equations on 10 minute ceiling forecasts.

Forecast Category (Feet)	Verifying Observation (Feet)						Total Forecasts
	0-100	200-400	500-900	1000-2900	3000-6000	CLR BELOW 6001	
0-100	814	198	23	10	0	76	1121
B 200-400	156	9130	797	177	23	149	10432
O 500-900	18	432	8580	810	37	127	10004
L 1000-2900	15	139	418	19040	726	440	20778
E 3000-6000	0	0	10	1027	38395	2079	41511
A CLR BELOW 6001	90	170	227	1195	4439	279835	285956
N Total:	1093	10069	10055	22259	43620	282706	369802
Observations							
Biases:	1.03	1.04	0.99	0.93	0.95	1.01	
Percent Correct:	96.2120						
Heidke Skill Score:	0.90305						
Chi Score:	251.93						
Threat Score:	0.82935						
Cases =	369802						

Table 21. Test sample results using non-bcolean AWOS-GEM on 10 minute ceiling forecasts.

Forecast Category (Feet)		Verifying Observation (Feet)						Total Forecasts
		0-100	200-400	500-900	1000-2900	3000-6000	CLR BELOW 6001	
N O N - B O O L E A N	0-100	813	197	23	9	0	76	1118
	200-400	155	8913	637	181	22	137	10045
	500-900	18	654	8476	614	35	231	10028
	1000-2900	19	151	726	19430	935	988	22249
	3000-6000	0	0	24	1084	39719	4361	45188
	CLR BELOW 6001	88	154	169	941	2909	276913	281174
Total:		1093	10069	10055	2225	43620	282706	369802
Observations								
Biases:		1.02	1.00	1.00	1.00	1.04	0.99	
Percent Correct: 95.7983								
Heidke Skill Score: 0.89475								
Chi Score: 65.37								
Threat Score: 0.82290								
Cases = 369802								

Further, for the 10 minute projection, the comparison in predicting VFR/LIFR and IFR/LIFR changes favored boolean prediction equations by 895 to 744 (VFR/IFR) and 231 to 181 (IFR/LIFR) in the net scores, respectively. At 60 minutes the net comparisons favored booleans 1038 to 986 for VFR/IFR changes and favored non-booleans alone 206 to 180 in IFR/LIFR changes.

7. SUMMARY AND FUTURE PLANS

This year's work has produced a significant improvement in skill in the prediction of elements in the automated observation by AWOS-GEM over persistence. This improvement covers the entire range of 10 to 120 minute forecasts and over all types of elements except for wind direction. Utilizing boolean predictors, however, has succeeded in overcoming some of this deficiency in wind direction forecasting for 10 minute and 60 minute projections. The results suggest that boolean predictor equations should be the rule rather than the exception. Greater computing power at the time the equations are developed is all that is necessary to accomplish this enhancement to GEM.

The elements of main concern for aviation, namely visibility and ceiling, are among the best forecast by GEM vis-a-vis persistence. Operational usage should dictate the characteristics desired regarding the forecasting of changes in these elements. Adjustments can be made to GEM's probability-to-categorical procedure so that false alarm rates, when forecasting changes, can be traded off with lower probabilities of detection or vice versa. The needs of the user can dictate the strategy to be employed.

A natural inclination exists on the part of meteorologists to include past observations as part of the predictor set. However, for a 10 minute forecast such information was not found to contribute anything significant over and above the most recent observation alone when the predictors from the 10 minute previous observation were allowed to enter the equations. Implicit in this undertaking is an attempt to include tendencies in the predictand as well as for other elements. This notion does not prove to be worthwhile as a source of predictive information here.

Numerous attempts at finding a thresholding scheme that would balance the forecast tables were made. One of the unsuccessful approaches attempted to utilize pattern recognition. This was a highly empirical study which attempted to fit the developmental data sample to arrive at probability estimates of each element's categories. Suffice it to say that this direction yielded very disappointing results when compared to more parametric efforts and is not a recommended avenue for future research endeavors. Furthermore, in the area of parametric approaches, efforts to maximize the Heidke skill score, the Threat score, the Critical Success Index, and the minimization of Chi score through the Beta distribution model also proved less useful than the original Beta approach that attempts to balance forecasts with observations. The inflation of the forecast variance, however, succeeded as was mentioned above. The successful method that was found appears in Appendix B.

The one remaining task that was planned for this year's work was the test on the geographically diverse use of the AWOS GEM weather prediction algorithm. Previous work had shown that an hourly "GEM-type" weather prediction algorithm was not site specific (reference Miller 1981). We had planned to demonstrate the ability of the GEM algorithm (developed using the Sterling, Virginia data) to forecast weather at the Indianapolis Downtown Heliport (Indianapolis, Indiana) and at the FAA Technical Center Heliport (Atlantic City, New Jersey). Unfortunately, difficulties with the prototype AWOS hardware prevented us from obtaining the months of data required from either site. When sufficient data are available from sites other than Sterling, a test of the generalized AWOS GEM algorithm could be made using these data.

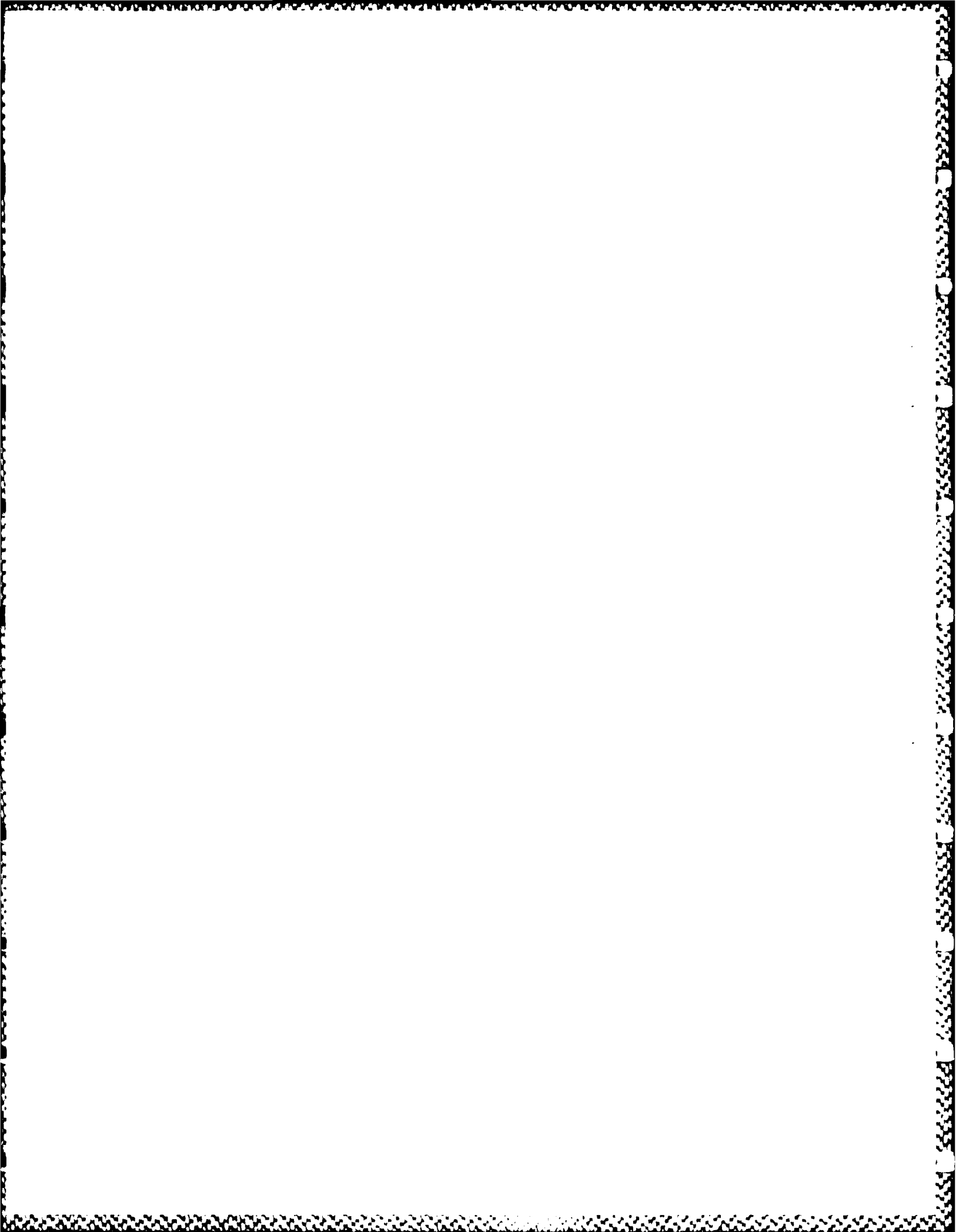
In summary, the meteorological testing of AWOS GEM has proven its forecasting skill. Based on this success, we have sketched a plan for an operational demonstration (see outline in Appendix E). This test would demonstrate the operational usefulness of AWOS GEM as an aviation weather forecasting product. Once funding is available, this effort would take approximately 12 months.

8. ACKNOWLEDGMENTS

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APPENDIX A. ACRONYMS AND ABBREVIATIONS

Artais--Manufacturer of the Sterling, Virginia AWOS unit.

AWOS--The FAA's Automated Weather Observing System.

AWOS-GEM--A version of GEM applied to AWOS predictors and predictands.

Bias--Defined in Appendix C.

Boolean--A predictor defined as the logical AND of two zero-one predictors.

Brier Score--Defined in Appendix C.

C--Climatology.

CAFTI--NWS's Committee on Analysis and Forecast Technique Implementation.

Chi Score--Chi Square statistic computed from a contingency table's row and column totals for determining the diagonal element's expected value.

DP--Dew point temperature.

FAA--Federal Aviation Administration.

FARC--False alarm rate when predicting change (defined in Appendix C).

Ft--Feet.

FT--Official NWS Terminal Forecast.

G--GEM in table summarizing change forecasts.

GEM--Generalized Exponential Markov model.

GMT--Greenwich Mean Time.

Heidke Score--Defined in Appendix C.

IFR--Instrument Flight Rules denoting visibility less than 3 miles and/or ceiling less than 1000 feet.

KAYPRO XT--An IBM-XT compatible hard disk computer made by KAYPRO Corp.

Log Score--Defined in Appendix C.

LOW-IFR--Low Instrument Flight Rules (LIFR) denoting visibility less than 1 mile and/or ceiling less than 500 feet.

M--Minute.

Mi--Mile.

MOS--Model Output Statistics.

Non-Boolean--Denotes predictors which are not combinations of two individual zero-one predictors.

NWS--National Weather Service.

O--Observation in table summarizing change forecasts.

P--Persistence in table summarizing change forecasts.

Percent Correct--Defined in Appendix C.

PGO--Combination of Persistence, GEM, and Observation in table summarizing change forecasts.

PODC--Probability of Detecting Change (see Appendix C).

POHC--Probability of Hitting Change (see Appendix C).

PRESS--Station pressure.

R--Correlation coefficient.

REEP--Regression Estimation of Event Probabilities statistical prediction procedure.

SLAM--Screening Lattice Algorithm

TDL--Techniques Development Laboratory.

TEMP--Dry bulb temperature.

Threat Score--Defined in Appendix C.

VAR--Variance.

VFR--Visual Flight Rules denoting visibility 3 miles or greater and ceiling 1000 feet or greater.

VIS--Visibility.

WD--Wind direction.

WS--Wind speed.

WX--Present weather.

APPENDIX B. THRESHOLDING PROCEDURE

Since GEM's inception as a statistical forecasting procedure, whether in hour-by-hour predictions or in minute-by-minute predictions, the results on test sample data have consistently shown GEM's Brier Scores to be superior to conditional persistence. However, the other skill measures such as Percent Correct and the Heidke Skill Score have not revealed a corresponding superiority. The problem has been attributed to weaknesses inherent in the Beta thresholding method. Until now all but one approach to replace the Beta scheme has failed to do any better. The most glaring disappointment has been efforts to base the thresholding on empiricism--choose the threshold that functions best on the dependent data. Almost equally disappointing has been efforts to utilize a loss function approach in conjunction with classical decision theory.

The approach that has been found to better the Beta thresholding procedure and to have produced the highly successful results presented in the section on verification evolved as follows:

The variance of a regression predicted value, \hat{Y} , is known to equal the multiple correlation coefficient squared times the original variance of Y, or,

$$\text{Var}(\hat{Y}) = R^2 \times \text{Var}(Y).$$

in the case of GEM, which has all of its predictands (its Y's) as zero-one variables, the original variance of each predictand is nothing but the climatology (C) of Y times (1.0-climatology of Y). For a given Y the variance of \hat{Y} is

$$\text{Var}(\hat{Y}) = R^2 \times C \times (1 - C).$$

As the projection interval of Y gets larger, the correlation R gets smaller causing the variance of the predicted value to get correspondingly smaller. In conjunction with this, any effort to use the prediction of the category which has the maximum predicted value of \hat{Y} as a thresholding procedure is doomed to eventually predict the category with the highest climatology.

To make the variance of a predicted value, say, \hat{Y} retain the original variance equivalent to Y's requires a simple transformation of dividing \hat{Y} by R. It is known that the variance of a linear function, say, $V = L \times Z$ gives the variance of V to be L^2 times the variance of Z. In our case L is $1/R$ leaving our new $\hat{\hat{Y}}$ with the variance desired, that is,

$$\text{Var}(\hat{\hat{Y}}) = C \times (1 - C)$$

since the R^2 's cancel one another.

This operation now inflates the variance of the predictions to that of Y, however, its expected value no longer equals the climatology of Y. The following transformation will impose this expectation condition:

$$\hat{\hat{Y}} = (\hat{Y} - C)/R + C.$$

An inflation of this type was used by Klein, Lewis, and Enger (1959) and is employed in MOS wind speed forecasting. The novelty of using inflation here is that by choosing the category whose inflation value is largest represents a

decision rule that yields surprisingly balanced contingency tables--more balanced than the Beta thresholding method has ever accomplished. More importantly, the skill scores are enhanced considerably as was shown in the section on verification.

APPENDIX C. EVALUATION PLAN FOR GEM BASED ON AUTOMATED OBSERVATIONS

The Techniques Development Laboratory (TDL) over the past 3 years has developed and tested Generalized Equivalent Markov (GEM) regression equations for predicting each element observed by the automated observing system operated by the National Weather Service (NWS) at Sterling, Virginia (see Miller, 1984; 1986; and 1987). These elements are:

<u>Predictand</u>	<u>Number of Categories</u>
o Pressure	9
o Temperature	14
o Dew point depression	5
o Wind speed	5
o Wind direction	5
o Cloud height 1	7
o Cloud height 2	6
o Cloud height 3	7
o Cloud cover 1	5
o Cloud cover 2	4
o Cloud cover 3	4
o Visibility	6
o Precipitation*	2
o Gusts	5
o Ceiling	6
o Total cloud amount	5

*Precipitation sensor inoperative

Prediction times are at 10-minute intervals from 10 to 120 minutes.

Procedures for weather forecast verification and evaluation have been documented in the National Verification Plan (NVP), see National Weather Service (1982). This evaluation plan for GEM conforms, as much as is practical, with the guidelines of the NVP as they apply to forecasts at very short range (10-120 minutes). New products are evaluated for scientific merit by the NWS Committee on Analysis and Forecast Technique Implementation (CAFTI). CAFTI is a recommending body and does not have approval authority.

For a scientific evaluation of GEM's ability to predict each of the predictands and for each of the projection times specified above, we intend to prepare the following comparative statistics for both GEM and persistence over an independent sample of about 360,000 cases:

- o Brier score (mean square error)
- o Contingency table
- o Percent correct
- o Heidke skill score
- o Bias by category
- o Threat score for the lowest two ceiling and visibility categories
- o Log score (for ceiling and visibility only)

See Appendix C.1 for details.

Furthermore, an operational-evaluation table will be prepared which will display the number of times in the independent sample that GEM successfully predicted changes of Visual Flight Rules (VFR) to Instrument Flight Rules (IFR) and IFR to VFR for both visibility and ceiling. This table will display the probability of hitting changes (POHC), probability of detecting change (PODC), and the false alarm rates when predicting change (FARC) for 10, 20, ..., 120 minute projections. An example of such a table, Table C.3, is given in the appendix. Note that these three scores--POHC, PODC, and FARC--pertain to only those situations when a change occurs or is forecast. Also, a similar table will be prepared regarding changes from IFR to LOW IFR and from LOW IFR to IFR.

To help in the overall evaluation, we have already documented how a GEM approach in hourly increments from 1-8 hours compares with persistence, MOS, and the official FT's predominant conditions (see Miller, 1981; Miller and Perrone, 1985; and Perrone and Miller, 1985).

The proposed conditions for a favorable scientific evaluation of GEM are:

- GEM's Brier score on independent data must be better than persistence's conditional probabilities in 70% of all predictands.
- GEM's scoring on independent data among 1) percent correct, 2) Heidke skill score, 3) threat score, and 4) log score should have more scores favoring GEM than persistence when all predictands are considered.
- GEM must demonstrate on independent data that it is capable of predicting changes from VFR to IFR, from IFR to VFR, from IFR to LOW IFR, and from LOW IFR to IFR on visibility and ceiling that yields a net improvement over persistence in a majority of all 10 minute projection times from 10 m to 120 m. (See, for example, the last row of Table C.3 in Appendix C.1.)
- Timeliness in the issuance of a forecast is deemed satisfactory if a completed GEM forecast can be prepared inside 30 seconds on a micro-computer once a request is made. This assumes that the observation enters automatically through the RS232 port (like that now employed) or is already resident through manual entry. A demonstration on previously collected observations is planned.

Presentation of the verification results will be made at the November 18, 1987 CAFTI meeting. CAFTI will be asked to recommend implementation of GEM by the NWS and/or the FAA if the conditions for meteorological significance and operational usefulness stated above are met.

Approval of a decision to implement this technique would still most likely require the review of the implementation plan by NWS management.

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APPENDIX C.1

Definition of Verification Scores¹

For all the following scores, these definitions apply:

N = sample size (number of cases),
f_i = the ith forecast, and
o_i = the ith (matching) observation.

The following score is appropriate for variables in probabilistic form:

Brier score (BS)--The Brier score measures the mean square error. Lower values are better. The Brier score is relevant when f_i is a probability forecast of an event in the range zero to one and o_i is one if the event occurred and zero if it did not occur. In this context, an "event" is defined to be one of two or more exhaustive and mutually exclusive categories of a weather element. It is customary, when the weather element is divided into more than two categories, to compute a Brier score over all categories.

$$BS = \frac{1}{N} \sum_{i=1}^N \sum_{j=1}^k (f_{ij} - o_{ij})^2$$

where j refers to the k categories of the weather element.

The following scores are appropriate when the forecasts and observations each naturally occur in, or are put into, one of m mutually exclusive and exhaustive categories.

Contingency table--not a score as such, but contains all verification information for the discrete variables (see Table C.1). The element X_{ij} in the table is the number of times the forecast was in the jth category and the observation was the ith category. The row and column totals are also shown here with the subscript p. Various scores can be computed from these elements.

¹Definition of all scores except POHC, PODC, and POFC follow National Weather Service (1982).

Table C.1 Contingency table.

Observed Category	Forecast Categories				
	1	2	...	m	Total
1	X_{11}	X_{12}	...	X_{1m}	X_{1p}
2	X_{21}	X_{22}	...	X_{2m}	X_{2p}
.
.
.
m	X_{m1}	X_{m2}	...	X_{mm}	X_{mp}
Total	X_{p1}	X_{p2}	...	X_{pm}	X_{pp}

Percent Correct (PC)--the fraction of the time a correct forecast was made, regardless of the category, expressed in percent. Larger values are better.

$$PC = \frac{\sum_{i=1}^m X_{ii}}{X_{pp}} \times 100.$$

Bias by category (BIAS)--measures the tendency to overforecast ($BIAS > 1$) or underforecast ($BIAS < 1$) a particular category. A bias of one indicates no overforecasting or underforecasting. The bias for the i th category is:

$$BIAS_i = \frac{X_{pi}}{X_{ip}}.$$

Heidke skill score (SS)--the skill score measures the fraction of possible improvement afforded by the forecasts over a test set of forecasts. The test forecasts are values expected by chance computed on the marginal totals of the contingency table. Larger values are better. The Heidke skill score is highly influenced by the "balance" in the contingency table from which it is measured since it is based upon the expectation of chance.

$$SS = \frac{NC - E}{T - E} \quad \text{where number correct (NC)} = \sum_{i=1}^m X_{ii},$$

$$T = X_{pp}, \quad E = \sum_{i=1}^m (X_{ip} \cdot X_{pi}) / T$$

Threat score (TS)--the fraction of the time the threat event was correctly forecast when there was indeed a threat. This is computed from a contingency table when there are only two categories ($m=2$), the first of which is for a "threat" event, such as low ceilings or low visibilities. A threat, for this

purpose, is defined as a situation where either the threat event occurred, or was forecast, or both. The TS is also called the critical success index (CSI).

$$TS = \frac{X_{11}}{X_{11} + X_{12} + X_{21}}$$

MacDonald aviation log score--the rationale of the score is that the hazard to aviation of a missed forecast is (approximately) proportional to the absolute value of the logarithm of the error. The score itself is an average of these logarithmic errors.

$$\text{Log score (LS)} = \frac{50}{N} \sum_{i=1}^N \left| \log_{10} \frac{f_i}{o_i} \right|$$

For the specific six categories of ceiling and visibility used in this paper, the Log score may be approximated by the scoring matrices given in Table C.2 provided the number of forecasts (N) is large. The score is given by:

$$LS = \frac{1}{N} \sum_{i=1}^6 \sum_{j=1}^6 f_{ij} m_{ij}$$

where f_{ij} are the elements in the forecast-observed contingency table and m_{ij} are the elements of the appropriate (ceiling and visibility) matrix given in Table C.2.

Table C.2. Approximate scoring matrices for MacDonald aviation log score.

Observed Categories	Element											
	Visibility Forecast Categories						Ceiling Forecast Categories					
	1	2	3	4	5	6	1	2	3	4	5	6
1	0	30	45	69	80	87	0	30	49	65	88	104
2	19	0	10	34	45	52	23	0	11	26	49	65
3	42	18	0	11	22	30	42	12	0	7	31	47
4	57	33	7	0	7	15	64	34	16	0	9	24
5	67	43	17	6	0	5	82	52	34	9	0	6
6	73	49	23	13	4	0	89	59	41	16	0	0

The following verification statistics pertain to evaluating GEM's skill at predicting changing conditions. Specific conditions can be varied according to operational requirements; however, at the outset, these will be defined as instrument flight rules (IFR) of < 3 miles in visibility and < 1000 feet in ceiling and visual flight rules (VFR) of \geq 3 miles in visibility and \geq 1000 feet in ceiling. Table C.3 shows, as an example, a dependent sample of data giving the following statistics for 10, ..., 120 m projections. In the equations below, the term X_{11} IFR, for example, refers to a contingency table like Table C.1 containing data for only the cases when the initial condition was IFR.

Probability of hitting changes--probability of correctly forecasting a change to occur given that the persistence condition is either IFR or VFR.

$$\text{POHC (given that persistence is IFR)} = \frac{X_{11} | \text{IFR}}{X_{11} | \text{IFR} + X_{21} | \text{IFR}}$$

$$\text{POHC (given that persistence is VFR)} = \frac{X_{11} | \text{VFR}}{X_{11} | \text{VFR} + X_{21} | \text{VFR}}$$

Probability of detecting change (PODC)--the probability of correctly forecasting the threat event given that the persistence condition is either IFR or VFR.

$$\text{PODC (given that persistence is IFR)} = \frac{X_{11} | \text{IFR}}{X_{11} | \text{IFR} + X_{12} | \text{IFR}}$$

$$\text{PODC (given that persistence is VFR)} = \frac{X_{11} | \text{VFR}}{X_{11} | \text{VFR} + X_{12} | \text{VFR}}$$

False alarm rate when predicting change (FARC)--the fraction of the forecasts of the threat event that did not verify given that the persistence condition was either IFR or VFR.

$$\text{FARC (given that persistence is IFR)} = 1 - \frac{X_{11} | \text{IFR}}{X_{11} | \text{IFR} + X_{21} | \text{IFR}}$$

$$\text{FARC (given that persistence is VFR)} = 1 - \frac{X_{11} | \text{VFR}}{X_{11} | \text{VFR} + X_{21} | \text{VFR}}$$

Note that FARC is 1 - POHC under the respective persistence conditions of IFR and VFR.

In the final row, Table C.3 also displays the net gain of GEM over persistence for visibility and ceiling. That is, in the PGO column, the conditions 011 and 100 constitute situations in which GEM successfully predicted change while 010 and 101 constitute situations in which persistence was correct and GEM was incorrect when predicting a change. Adding the 011 and 100 quantities while subtracting the 010 and 101 quantities yields a net which, if positive, shows that GEM is preferred in that many situations over persistence in this sample of data.

OBSERVATIONAL FREQUENCY COUNTS

VISIBILITY		PROJECTION TIME (MINUTES)											
PGO		10	20	30	40	50	60	70	80	90	100	110	120
0 000		1327	1223	1142	1063	1017	970	906	876	875	818	797	773
1 001		152	280	360	432	489	525	590	614	678	720	733	752
2 010		64	47	45	29	30	28	30	26	4	3	6	6
3 011		112	80	66	72	64	66	62	64	27	31	33	33
4 100		96	66	57	55	55	60	56	59	50	47	53	55
5 101		107	96	102	101	93	105	105	105	90	93	88	84
6 110		126	274	351	404	469	513	549	592	636	662	692	725
7 111		27184	26993	26864	26752	26635	26547	26442	26348	26230	26204	26127	26059
TOTAL		29168	29059	28987	28908	28852	28814	28740	28684	28640	28578	28529	28487
GIVEN PERSISTENCE IS IFR													
POHC		0.636	0.630	0.595	0.713	0.681	0.702	0.674	0.711	0.871	0.912	0.846	0.846
PODC		0.424	0.222	0.155	0.143	0.116	0.112	0.095	0.094	0.038	0.041	0.043	0.042
FARC		0.364	0.370	0.405	0.297	0.319	0.299	0.326	0.289	0.129	0.088	0.154	0.154
GIVEN PERSISTENCE IS VFR													
POHC		0.473	0.407	0.358	0.353	0.372	0.364	0.348	0.360	0.357	0.336	0.376	0.396
PODC		0.432	0.194	0.140	0.120	0.105	0.105	0.093	0.091	0.073	0.066	0.071	0.071
FARC		0.527	0.593	0.642	0.647	0.628	0.636	0.652	0.640	0.643	0.664	0.624	0.604
CEILING		PROJECTION TIME (MINUTES)											
PGO		10	20	30	40	50	60	70	80	90	100	110	120
0 000		1708	1577	1499	1456	1417	1373	1333	1288	1263	1229	1179	1157
1 001		110	90	156	215	254	292	327	364	402	432	442	461
2 010		0	44	46	43	37	37	43	42	34	36	45	39
3 011		0	101	100	83	85	82	76	75	66	62	86	88
4 100		0	73	77	74	76	73	67	77	72	73	75	67
5 101		0	51	53	60	71	71	77	82	79	73	83	85
6 110		114	108	182	237	258	310	347	363	403	435	455	490
7 111		27236	27015	26874	26740	26654	26576	26470	26393	26321	26238	26164	26100
TOTAL		29168	29059	28987	28908	28852	28814	28740	28684	28640	28578	28529	28487
GIVEN PERSISTENCE IS IFR													
POHC	**	0.697	0.685	0.659	0.697	0.689	0.639	0.641	0.660	0.633	0.656	0.693	
PODC	0.000	0.529	0.391	0.279	0.251	0.219	0.189	0.171	0.141	0.126	0.163	0.160	
FARC	**	0.303	0.315	0.341	0.303	0.311	0.361	0.359	0.340	0.367	0.344	0.307	
GIVEN PERSISTENCE IS VFR													
POHC	**	0.589	0.592	0.552	0.517	0.507	0.465	0.484	0.477	0.500	0.475	0.441	
PODC	0.000	0.403	0.297	0.238	0.228	0.191	0.162	0.175	0.152	0.144	0.142	0.120	
FARC	**	0.411	0.408	0.448	0.483	0.493	0.535	0.516	0.523	0.500	0.525	0.559	
NET GEM VS PERS		37	82	54	51	49	40	6	20	8	8	25	29

Table C.3. Observational frequency counts of a dependent sample of data stratified for demonstrating GEM's ability to predict IFR to VFR and VFR to IFR changes. The PGO column gives Persistence (P), GEM (G), and the verifying observation (O), respectively. 0 denotes IFR (< 3 mi, < 1000 ft) and 1 denotes VFR (\geq 3 mi, \geq 1000 ft).




U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE
Silver Spring, Md. 20910

W/OM23:SMZ

DEC 18 1987

MEMORANDUM FOR: Addressees Listed Below

FROM: Dr. Ronald L. Lavoie 
Chairman, CAFTI

SUBJECT: Highlights of CAFTI Meeting, November 18, 1987

The NWS Committee on Analysis and Forecast Techniques Implementation (CAFTI) met at 1:00 p.m., Wednesday, November 18, 1987, in Room 128, Gramax Building, Silver Spring, MD. The following members and/or alternates were present:

Dr. R. Lavoie	Dr. E. Kalnay
Dr. H. Glahn	Dr. J. McDonell
Mr. G. Carter	Mr. R. Racer
Mr. H. O'Neil	Dr. R. McPherson
Mr. S. Zubrick	Mr. J. Dinges

Attached are meeting highlights and some of the briefing materials presented at the meeting. The next regular bi-monthly meeting is scheduled for Wednesday, January 20, 1988, at 1:00 p.m. in Room 206, World Weather Building, Camp Springs, MD.

Attachments

Addressees:

CAFTI Members
SSD Chiefs, W/ER3, W/SR3, W/CR3, W/WR3
Chief, Operations Division, W/AR1
Staff Meteorologist, W/PR1

cc:

Wx1	W/OM23	W/OS02
LA-W	W/NMC	W/OSD
W/OM	W/NMC5	W/OSD1
W/OM1	W/NMC6	W/FC - J. Almazon, NBOC6, Room 300
W/OM2	W/NMC8	W/TPO
W/OM21	W/OSO	W/OH

Invited Participants:

W/OSD2x3 - R. Miller



HIGHLIGHTS -- CAFTI MEETING OF NOVEMBER 18, 1987

Before addressing the first agenda item, the CAFTI Chairman announced that all future CAFTI agenda items will have a time limit listed on the CAFTI agenda. Requestors of agenda items are asked to state their anticipated presentation time to the CAFTI Executive Secretary when scheduling agenda items. Normally, 10 to 20 minutes is sufficient for oral presentations, with an additional 5 to 15 minutes for discussion.

- 1) Update on Very Short Range Statistical Forecasting by GEM - R. Miller - W/OSD2x3 - Information Item (See Briefing Materials, Part A).

Dr. Miller briefed CAFTI members on the latest verification results of using GEM to make very short range (10-120 minute) forecasts of various weather elements. Dr. Miller described how Brier Scores based on GEM's probability forecasts have consistently been better than conditional persistence, but GEM's categorical forecasts have not shown a corresponding superiority when using other skill measures (such as percentage correct and Heidke Score). This lack of correspondence was traced to the use of the Beta thresholding method. However, Dr. Miller said that a new approach called "variance inflation" as used by Klein, Lewis, and Enger (1959)¹ yielded considerably enhanced skill scores. This skill increase is traceable to the more balanced contingency tables that the inflation method yields compared to the tables derived from the Beta thresholding method.

In contrasting the Beta distribution versus inflation methods for over 300,000 observed test-sample results, Dr. Miller showed that the average scores for GEM with the new inflation method were now better than persistence in 69% of the comparisons, poorer in 16% and the same in 15%. Thresholding is indeed an important factor, and the improvement in scores resulting from the use of the inflation method is remarkable. CAFTI was gratified that Dr. Miller's efforts have produced better scores, but noted that false alarm rates were quite high for some categories of changing visibility. CAFTI views the GEM technique for very short range forecasting as worthy of operational use and its further development should be pursued. An implementation plan should be reviewed by NWS management before implementation of GEM.

- 2) Proposed Procedures for Field Notification of NMC/TDL Model/Guidance Changes - R. Racer - W/OM23, Action Item,

Much discussion concerning the proposed procedures centered on the meaning of "significant NMC model and TDL guidance changes...". However, the intent of these procedures was really to determine what messages are required AFTER a change has been coordinated with the CAFTI. This coordination does not mean that CAFTI acts as the sole determining body of the significance of model and guidance changes, but acts as a peer review of the scientific and technical basis of the change, and provides recommendations to the Director, Office of Meteorology.

¹Klein, W.H., B.M. Lewis, and I. Enger, 1959: Objective prediction of five-day mean temperatures during winter. J. Meteor., 16, 672-682.

APPENDIX E. TEST PLAN

The verification results obtained from AWOS-GEM and presented to CAFTI suggest that an on-site test be performed. Specifications suggested for performing such a test are given below:

Location

Sterling, Virginia NWS's test and evaluation facility

Equipment

AWOS system (Artais AWOS already in place)

Personal microcomputer (e.g., a Kaypro XT with a hard disk)

Communication Lines

Communication lines are already in place

Manpower

Meteorologist 3-6 man month to study characteristics of AWOS forecasts under various weather circumstances

Computer programmer 3-6 man months

Statistician 3-6 man months

Funding

Monies required amount to about \$3,000 for a computer and streaming tape drive

Cost of the manpower required

Objectives

- To perform a critical analysis of microcomputer based AWOS-GEM
- To save input observation as the persistence observation and as the observation from which the AWOS-GEM forecast is made (include date and time in some structured form)
- To save verifying observations for each 10 minute projection for 10-120M
- To save meteorologist's forecast coinciding with those of AWOS-GEM
- To save official FT for the same period (if possible)
- To compile remarks made by the meteorologist about the forecasts
- To compile remarks made by the meteorologist about the situation as to its level of meteorological significance and of GEM's operational usefulness
- To evaluate the timeliness of the AWOS GEM forecasts (continuous or on demand, number of projections fixed or specified by user)
- To evaluate the acceptability of the AWOS-GEM format
- To evaluate various dissemination media (voice, hard copy, telephone, probabilities, categories, best single value)

APPENDIX F. VERIFICATION TABLE AND SCORES

Page No.

GEM Versus Persistence

10 Minute Projections	F- 2 thru F- 17
Pressure	F- 2
Temperature	F- 3 thru F- 4
Dew Point Depression	F- 5
Wind Speed	F- 6
Wind Direction	F- 7
Cloud Height One, Two, and Three	F- 8 thru F- 10
Cloud Cover One, Two, and Three	F- 11 thru F- 13
Visibility	F- 14
Gusts	F- 15
Ceiling	F- 16
Total Cloud Amount	F- 17
20 Minute Projections	F- 18 thru F- 33
30 Minute Projections	F- 34 thru F- 49
40 Minute Projections	F- 50 thru F- 65
50 Minute Projections	F- 66 thru F- 81
60 Minute Projections	F- 82 thru F- 97
70 Minute Projections	F- 98 thru F-113
80 Minute Projections	F-114 thru F-129
90 Minute Projections	F-130 thru F-145
100 Minute Projections	F-146 thru F-161
110 Minute Projections	F-162 thru F-177
120 Minute Projections	F-178 thru F-193

GEM VS. PERSISTENCE 10 MINUTE PROJECTION

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTAL
	0-29.235	24	0	0	0	0	0	0	0	24
	29.236-29.530	24	3893	61	0	0	0	0	0	3917
	29.531-29.677	0	53	13163	254	0	0	0	0	13470
	29.678-29.825	0	0	262	41933	965	0	0	0	43160
	29.826-29.973	0	0	0	1019	90030	1003	0	0	92052
	29.974-30.120	0	0	0	0	1012	94555	962	0	96549
	30.121-30.268	0	0	0	0	997	78794	536	0	80327
	30.269-30.563	0	0	0	0	0	529	37556	42	38127
	30.564 +	0	0	0	0	0	0	32	2076	2108
COLUMN TOTALS	31	3970	13486	43206	92007	96555	80305	38124	2118	369862
BIASES	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	

PERCENT CORRECT 99.8921
 PERSISTENCE SCORE 99.97355
 GEM SCORE 99.8921

VALUES = 369862

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTAL
	0-29.235	24	0	0	0	0	0	0	0	24
	29.236-29.530	24	3893	61	0	0	0	0	0	3917
	29.531-29.677	0	53	13163	254	0	0	0	0	13470
	29.678-29.825	0	0	262	41933	965	0	0	0	43160
	29.826-29.973	0	0	0	1019	90030	1003	0	0	92052
	29.974-30.120	0	0	0	0	1012	94555	962	0	96549
	30.121-30.268	0	0	0	0	997	78794	536	0	80327
	30.269-30.563	0	0	0	0	0	529	37556	42	38127
	30.564 +	0	0	0	0	0	0	32	2076	2108
COLUMN TOTALS	31	3970	13486	43206	92007	96555	80305	38124	2118	369862
BIASES	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	

PERCENT CORRECT 99.8921
 PERSISTENCE SCORE 99.97355
 GEM SCORE 99.8921

VALUES = 369862

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5-14	0	800	44	0	0	0	0	0	0	0	0	0	0	0	844
15-24	0	82	8903	1111	0	0	0	0	0	0	0	0	0	0	10096
25-34	0	0	979	44233	2662	7	0	0	0	0	0	0	0	0	47941
35-39	0	0	0	2607	31631	3682	18	0	0	0	0	0	0	0	37308
40-44	0	0	0	7	3041	28215	2865	13	0	0	0	0	0	0	34141
45-49	0	0	0	0	11	2825	22742	2657	9	0	0	0	0	0	28244
50-54	0	0	0	0	2	24	2599	23216	3565	14	0	0	0	0	28520
55-59	0	0	0	0	0	0	25	2608	26573	2251	9	0	0	0	25466
60-64	0	0	0	0	0	0	0	29	2201	22239	2970	0	0	0	27431
65-74	0	0	0	0	0	0	0	0	14	2913	64257	2432	0	0	69616
75-84	0	0	0	0	0	0	0	0	0	0	2270	36321	1447	0	40038
85-94	0	0	0	0	0	0	0	0	0	0	0	1410	17097	261	18768
95 +	0	0	0	0	0	0	0	0	0	0	0	0	257	1132	1389
COLUMN TOTALS:	0	882	9926	48018	37337	34133	28251	28523	25462	27407	69506	40163	18801	1393	369802
BIASES:	99.99	0.96	1.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

PERCENT CORRECT: 86.9111
 HELDWE SKILL SCORE: 0.95326
 CHI SCORE: 5.35

CASES = 369802

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	< 5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
PERSISTENCE															
< 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 14	0	800	44	0	0	0	0	0	0	0	0	0	0	0	844
15 - 24	0	82	8903	1111	0	0	0	0	0	0	0	0	0	0	10096
25 - 34	0	0	979	44293	2662	7	0	0	0	0	0	0	0	0	47941
35 - 39	0	0	0	2607	31621	3062	18	0	0	0	0	0	0	0	37308
40 - 44	0	0	0	7	3041	28215	2865	13	0	0	0	0	0	0	34141
45 - 49	0	0	0	0	11	2825	22742	2657	9	0	0	0	0	0	28244
50 - 54	0	0	0	0	2	24	2599	23216	2665	14	0	0	0	0	28520
55 - 59	0	0	0	0	0	0	25	2608	20573	2251	9	0	0	0	25466
60 - 64	0	0	0	0	0	0	2	29	2201	22229	2970	0	0	0	27431
65 - 74	0	0	0	0	0	0	0	0	14	2913	64257	2432	0	0	69616
75 - 84	0	0	0	0	0	0	0	0	0	0	2270	36321	1447	0	40038
85 - 94	0	0	0	0	0	0	0	0	0	0	0	1410	17097	261	18768
95 +	0	0	0	0	0	0	0	0	0	0	0	0	257	1132	1389
COLUMN TOTALS:	0	882	9926	48018	37337	34133	28251	28523	25462	27407	69506	40163	18801	1393	369802
BIASES:	99.99	0.96	1.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

PERCENT CORRECT: 86.9111
 HEIDKE SKILL SCORE: 0.85326
 CHI SCORE: 5.35
 CASES = 369802

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS	
GEM	0 - 1	14852	7079	12	0	21943	
	2 - 7	7090	122961	8029	2	138082	
	8 - 15	12	7965	115782	5953	129712	
	16 - 25	0	7	5649	57758	65156	
	26 +	0	0	3	1656	14909	
COLUMN TOTALS:		21954	138012	129475	65369	14992	369802
BIASES:		1.00	1.00	1.00	1.00	0.99	

PERCENT CORRECT: 87.7775

HEIDKE SKILL SCORE: 0.82578

CHI SCORE: 1.63

CASES = 369802

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS	
	0 - 1	14852	7079	12	0	21943	
	2 - 7	7090	122961	8029	2	138082	
PERSISTENCE	8 - 15	12	7965	115782	5953	129712	
	16 - 25	0	7	5649	57758	65156	
	26 +	0	0	3	1656	14909	
	COLUMN TOTALS:	21954	138012	129475	65369	14992	369802
	BIASES:	1.00	1.00	1.00	1.00	0.99	

PERCENT CORRECT: 87.7775

HEIDKE SKILL SCORE: 0.82578

CHI SCORE: 1.63

CASES = 369802

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
0 - 1	6709	9474	7	0	0	16190
2 - 9	9555	277720	13120	16	0	300411
GEM 10 - 19	0	13080	37866	1204	0	52150
20 - 29	0	17	451	579	4	1051
30 +	0	0	0	0	0	0
COLUMN TOTALS:	16264	300291	51444	1799	4	369802
BIASES:	1.00	1.00	1.01	0.58	0.00	

PERCENT CORRECT: 87.3100
HEIDKE SKILL SCORE: 0.60192
CHI SCORE: 325.08

CASES = 369802

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
0 - 1	6709	9474	7	0	0	16190
2 - 9	9555	277762	13157	16	0	300490
PERSISTENCE 10 - 19	0	13050	37369	915	0	51334
20 - 29	0	5	910	866	3	1784
30 +	0	0	1	2	1	4
COLUMN TOTALS:	16264	300291	51444	1799	4	369802
BIASES:	1.00	1.00	1.00	0.99	1.00	

PERCENT CORRECT: 87.2648
HEIDKE SKILL SCORE: 0.60066
CHI SCORE: 0.83

CASES = 369802

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
GEM	0 - 44	32442	6029	802	277	198	149	920	51065
	45 - 89	6011	15595	2697	412	191	108	501	27044
	90 - 134	649	2548	12063	2640	621	222	453	19846
	135 - 179	217	392	2356	15303	5621	469	638	25480
	180 - 224	225	188	492	5039	47129	7282	1443	62416
	225 - 269	173	97	271	662	6912	17038	4076	30001
	270 - 314	771	516	494	613	1260	4148	39372	56451
	315 - 359	10633	1654	669	580	462	605	9057	97479
	COLUMN TOTALS:	51121	27019	19844	25526	62394	30021	56460	369802
	BIASES:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 68.3504
HEIDKE SKILL SCORE: 0.62327
CHI SCORE: 0.19

CASES = 369802

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
PERSISTENCE	0 - 44	32442	6029	802	277	198	149	920	51085
	45 - 89	6011	15595	2697	412	191	108	501	27044
	90 - 134	649	2548	12063	2640	621	222	453	19846
	135 - 179	217	392	2356	15303	5621	469	638	25480
	180 - 224	225	188	492	5039	47129	7282	1443	62416
	225 - 269	173	97	271	662	6912	17038	4076	30001
	270 - 314	771	516	494	613	1260	4148	39372	56451
	315 - 359	10633	1654	669	580	462	605	9057	97479
	COLUMN TOTALS:	51121	27019	19844	25526	62394	30021	56460	369802
	BIASES:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 68.3504
HEIDKE SKILL SCORE: 0.62327
CHI SCORE: 0.19

CASES = 369802

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS
GEM								
0 - 100	791	227	26	31	0	73	132	1280
200 - 400	183	11205	828	187	92	411	241	13147
500 - 900	22	833	10646	649	93	191	152	12586
1000 - 2900	15	166	740	27764	1897	862	144	31588
3000 - 6000	8	102	74	1841	60049	4806	86	66966
CLR BELOW 6001	97	360	163	1023	4888	229359	714	236604
X/-X	161	281	129	119	89	826	6026	7631
COLUMN TOTALS:	1277	13174	12606	31614	67108	236528	7495	369802
BIASES:	1.00	1.00	1.00	1.00	1.00	1.00	1.02	

PERCENT CORRECT: 93.5203

HEIDKE SKILL SCORE: 0.98170

CHI SCORE: 2.91

THREAT SCORE: 0.75316

CASES = 269802

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS
PERSISTENCE								
0 - 100	791	227	26	31	0	73	132	1280
200 - 400	183	11205	828	187	92	411	241	13147
500 - 900	22	833	10646	649	93	191	152	12586
1000 - 2900	15	166	740	27764	1897	862	144	31588
3000 - 6000	8	102	74	1841	60049	4806	86	66966
CLR BELOW 6001	97	360	163	1023	4888	229360	715	236606
X/-X	161	281	129	119	89	825	6025	7629
COLUMN TOTALS:	1277	13174	12606	31614	67108	236528	7495	369802
BIASES:	1.00	1.00	1.00	1.00	1.00	1.00	1.02	

PERCENT CORRECT: 93.5203

HEIDKE SKILL SCORE: 0.98170

CHI SCORE: 2.84

THREAT SCORE: 0.75316

CASES = 269802

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	873	96	30	25	0	232	1256
200 - 400	93	1404	156	44	0	211	1908
500 - 900	30	120	2650	630	33	887	4350
GEM 1000 - 2900	27	58	587	10018	1025	2177	13892
3000 - 6000	0	3	43	1029	35771	7306	44152
CLR BELOW 6001	209	206	892	2102	7382	293453	304244
COLUMN TOTALS:	1232	1887	4358	13848	44211	304266	369802
BIASES:	1.02	1.01	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 93.0685
HEIDKE SKILL SCORE: 0.77438
CHI SCORE: 0.94
THREAT SCORE: 0.64606

CASES = 369802

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	872	96	30	25	0	232	1255
200 - 400	93	1404	156	44	0	211	1908
500 - 900	30	120	2650	630	33	887	4350
PERSISTENCE 1000 - 2900	27	58	587	10018	1025	2177	13892
3000 - 6000	0	3	43	1029	35771	7306	44152
CLR BELOW 6001	210	206	892	2102	7382	293453	304245
COLUMN TOTALS:	1232	1887	4358	13848	44211	304266	369802
BIASES:	1.02	1.01	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 93.0682
HEIDKE SKILL SCORE: 0.77437
CHI SCORE: 0.90
THREAT SCORE: 0.64580

CASES = 369802

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	12	0	9	5	6	22	54
200 - 400	0	76	13	85	130	383	687
500 - 900	1	6	896	45	524	962	2454
1000 - 2900	3	80	69	1024	499	1227	2902
3000 - 6000	12	143	558	520	9582	5667	16482
CLR BELOW 6001	28	366	934	1245	5216	339434	347223
COLUMN TOTALS:	56	671	2479	2924	15957	347715	369802
BIASES:	0.96	1.02	0.99	0.99	1.03	1.00	

PERCENT CORRECT: 94.9221
 HEIDKE SKILL SCORE: 0.55885
 CHI SCORE: 18.84
 THREAT SCORE: 0.06377

CASES = 369802

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	12	0	9	5	6	22	54
200 - 400	0	76	14	85	130	383	688
500 - 900	1	6	896	45	524	982	2454
1000 - 2900	3	80	69	1025	499	1236	2912
3000 - 6000	12	136	546	514	9414	5330	15952
CLR BELOW 6001	28	373	945	1250	5384	339762	347742
COLUMN TOTALS:	56	671	2479	2924	15957	347715	369802
BIASES:	0.96	1.03	0.99	1.00	1.00	1.00	

PERCENT CORRECT: 94.9657
 HEIDKE SKILL SCORE: 0.55779
 CHI SCORE: 18.81
 THREAT SCORE: 0.06377

CASES = 369802

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW	6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	228612	7141	0	0	235753
	SCT	7527	60435	5735	978	74675
GEM	BKN	0	5589	10582	4114	20285
	OVC	0	1051	4004	34034	39089
	COLUMN TOTALS:	236139	74216	20321	39126	369802
	BIASES:	1.00	1.01	1.00	1.00	

PERCENT CORRECT: 90.2275
HEIDKE SKILL SCORE: 0.81842
CHI SCORE: 3.57

CASES = 369802

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW	6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	228616	7197	0	0	235813
	SCT	7523	60330	5724	990	74567
PERSISTENCE	BKN	0	5638	10593	4102	20333
	OVC	0	1051	4004	34034	39089
	COLUMN TOTALS:	236139	74216	20321	39126	369802
	BIASES:	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 90.2031
HEIDKE SKILL SCORE: 0.81795
CHI SCORE: 2.15

CASES = 369802

CLOUD COVER TWO

VERIFYING OBSERVATION

		CLR BELOW				ROW TOTALS
		6001	SCT	BKN	OVC	
GEM	CLR BELOW 6001	295659	5499	1743	3231	306132
	SCT	5599	17690	3971	177	27437
	BKN	1887	4469	11099	3197	20652
	OVC	3354	469	2740	9018	15581
COLUMN TOTALS:		306499	28127	19553	15623	369802
BIASES:		1.00	0.98	1.06	1.00	

PERCENT CORRECT: 90.1742
HEIDKE SKILL SCORE: 0.67626
CHI SCORE: 79.25

CASES = 369802

CLOUD COVER TWO

VERIFYING OBSERVATION

		CLR BELOW				ROW TOTALS
		6001	SCT	BKN	OVC	
PERSISTENCE	CLR BELOW 6001	295659	5499	1743	3231	306132
	SCT	5626	18021	4408	440	28495
	BKN	1860	4138	10662	2934	19594
	OVC	3354	469	2740	9018	15581
COLUMN TOTALS:		306499	28127	19553	15623	369802
BIASES:		1.00	1.01	1.00	1.00	

PERCENT CORRECT: 90.1455
HEIDKE SKILL SCORE: 0.67524
CHI SCORE: 5.45

CASES = 369802

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS	
GEM	CLR BELOW 6001	335949	2935	2135	2551	343570
	SCT	2855	3278	1432	11	7576
	BKN	2108	1356	4619	1222	9305
	OVC	2655	17	1105	5574	9351
COLUMN TOTALS:		343567	7586	9291	9358	369802
BIASES:		1.00	1.00	1.00	1.00	

PERCENT CORRECT: 94.4884
HEIDKE SKILL SCORE: 0.59220
CHI SCORE: 0.04

CASES = 369802

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS	
PERSISTENCE	CLR BELOW 6001	335949	2935	2135	2551	343570
	SCT	2855	3278	1432	11	7576
	BKN	2108	1356	4619	1222	9305
	OVC	2655	17	1105	5574	9351
COLUMN TOTALS:		343567	7586	9291	9358	369802
BIASES:		1.00	1.00	1.00	1.00	

PERCENT CORRECT: 94.4884
HEIDKE SKILL SCORE: 0.59220
CHI SCORE: 0.04

CASES = 369802

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
GEM	0 < 1/2	1032	162	52	13	6	1270
	1/2 < 1	261	1549	657	90	31	2604
	1 < 3	52	476	14562	2884	196	18273
	3 < 5	5	34	2341	27660	4312	34734
	5 < 7	1	3	133	3405	26069	30875
	7 +	0	0	76	351	4251	279046
COLUMN TOTALS:	1351	2224	17821	34403	34865	279138	369802
BIASES:	0.94	1.17	1.03	1.01	0.97	1.00	

PERCENT CORRECT: 93.3581

HEIDKE SKILL SCORE: 0.83824

CHI SCORE: 112.57

THREAT SCORE: 0.67582

CASES = 369802

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
PERSISTENCE	0 < 1/2	1061	249	110	17	6	1450
	1/2 < 1	197	1382	590	40	11	2225
	1 < 3	80	530	13926	2998	207	17853
	3 < 5	8	47	2828	26673	4251	34371
	5 < 7	2	11	243	4205	25845	34908
	7 +	3	5	124	470	4544	278995
COLUMN TOTALS:	1351	2224	17821	34403	34865	279138	369802
BIASES:	1.07	1.00	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 92.6809

HEIDKE SKILL SCORE: 0.82175

CHI SCORE: 7.47

THREAT SCORE: 0.56246

CASES = 369802

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS	
GEM	0 - 10	320724	13251	1441	25	4	335445
	11 - 20	9493	10493	2541	22	0	22549
	21 - 30	1471	2468	6440	433	4	10816
	31 - 40	39	12	439	484	18	992
	41 +	0	0	0	0	0	0
COLUMN TOTALS:							369802
BIASES:							1.01 0.86 1.00 1.03 0.00

PERCENT CORRECT: 91.4384
HEIDKE SKILL SCORE: 0.52727
CHI SCORE: 583.68

CASES = 369802

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS						
PERSISTENCE	0 - 10	318563	11784	1440	25	4	331816					
	11 - 20	11654	11960	2541	22	0	26177					
	21 - 30	1471	2468	6441	433	4	10817					
	31 - 40	30	12	439	465	18	964					
	41 +	9	0	0	19	0	28					
COLUMN TOTALS:							331727	26224	10861	964	26	369802
BIASES:							1.00	1.00	1.00	1.00	1.08	

PERCENT CORRECT: 91.2459
HEIDKE SKILL SCORE: 0.53735
CHI SCORE: 0.44

CASES = 369802

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	813	197	23	9	0	76	1118
200 - 400	155	8913	637	181	22	137	10045
500 - 900	18	654	8476	614	35	231	10028
GEM 1000 - 2900	19	151	726	19430	935	988	22249
3000 - 6000	0	0	24	1084	39719	4361	45188
CLR BELOW 6001	88	154	169	941	2909	276913	281174
COLUMN TOTALS:	1093	10069	10055	22259	43620	282706	369802
BIASES:	1.02	1.00	1.00	1.00	1.04	0.99	

PERCENT CORRECT: 95.7983

HEIDKE SKILL SCORE: 0.89475

CHI SCORE: 65.37

THREAT SCORE: 0.90290

CASES = 369802

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	813	197	23	9	0	76	1118
200 - 400	155	8913	637	181	22	137	10045
500 - 900	18	654	8476	614	35	231	10028
PERSISTENCE 1000 - 2900	19	151	726	19430	935	988	22249
3000 - 6000	0	0	24	1082	38912	3596	43614
CLR BELOW 6001	88	154	169	943	3716	277678	282746
COLUMN TOTALS:	1093	10069	10055	22259	43620	282706	369802
BIASES:	1.02	1.00	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 95.7869

HEIDKE SKILL SCORE: 0.89373

CHI SCORE: 64.11

THREAT SCORE: 0.82290

CASES = 369802

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
CLR BELOW 6001	228611	7141	0	0	235752
SCT	7528	34400	4964	108	47000
BKN	0	4891	13593	4545	23029
OVC	0	135	4432	59454	64021
COLUMN TOTALS:	236139	46567	22989	64107	369802
BIASES:	1.00	1.01	1.00	1.00	

PERCENT CORRECT: 90.8751
HEIDKE SKILL SCORE: 0.83196
CHI SCORE: 4.85

CASES = 369802

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
CLR BELOW 6001	228616	7197	0	0	235813
SCT	7523	34342	4962	108	46935
BKN	0	4893	13595	4545	23033
OVC	0	135	4432	59454	64021
COLUMN TOTALS:	236139	46567	22989	64107	369802
BIASES:	1.00	1.01	1.00	1.00	

PERCENT CORRECT: 90.8613
HEIDKE SKILL SCORE: 0.83168
CHI SCORE: 3.56

CASES = 369802

GEM VS. PERSISTENCE 20 MINUTE PROJECTION

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTALS
GEM										
0 - 29.235	1	30	0	0	0	0	0	0	0	31
29.236 - 29.530	30	3740	112	0	0	0	0	0	0	3882
29.531 - 29.677	0	94	12664	434	0	0	0	0	0	13192
29.678 - 29.825	0	0	457	40114	1651	0	0	0	0	42222
29.826 - 29.973	0	0	0	1671	86557	1621	0	0	0	89849
29.974 - 30.120	0	0	0	0	1656	91123	1612	0	0	94391
30.121 - 30.268	0	0	0	0	0	1644	75924	867	0	78435
30.269 - 30.563	0	0	0	0	0	0	842	36192	67	37101
30.564 +	0	0	0	0	0	0	0	52	1981	2033
COLUMN TOTALS:	31	3864	13233	42219	89864	94388	78378	37111	2048	361136
BIASES:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	

PERCENT CORRECT: 96.4446
 HEIGHT SKILL SCORE: 0.95539
 GEM SCORE: 0.97

CASES = 361136

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTALS
PERSISTENCE										
0 - 29.235	1	30	0	0	0	0	0	0	0	31
29.236 - 29.530	30	3740	112	0	0	0	0	0	0	3882
29.531 - 29.677	0	94	12664	434	0	0	0	0	0	13192
29.678 - 29.825	0	0	457	40114	1651	0	0	0	0	42222
29.826 - 29.973	0	0	0	1671	86557	1621	0	0	0	89849
29.974 - 30.120	0	0	0	0	1656	91123	1612	0	0	94391
30.121 - 30.268	0	0	0	0	0	1644	75924	867	0	78435
30.269 - 30.563	0	0	0	0	0	0	842	36192	67	37101
30.564 +	0	0	0	0	0	0	0	52	1981	2033
COLUMN TOTALS	31	3864	13233	42219	89864	94388	78378	37111	2048	361136
BIASES:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	

PERCENT CORRECT: 96.4446
 HEIGHT SKILL SCORE: 0.95539
 PERSISTENCE SCORE: 0.97

CASES = 361136

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 14	0	706	39	0	0	0	0	0	0	0	0	0	0	0	745
15 - 24	0	110	8122	1508	0	0	0	0	0	0	0	0	0	0	9740
25 - 34	0	0	1246	41773	3619	67	0	0	0	0	0	0	0	0	46705
35 - 39	0	0	0	3566	28747	4190	90	2	0	0	0	0	0	0	36595
40 - 44	0	0	0	36	4161	25269	3808	125	1	0	0	0	0	0	33400
45 - 49	0	0	0	1	74	3774	20077	3570	88	2	0	0	0	0	27586
50 - 54	0	0	0	0	1	102	3542	20627	3555	104	1	0	0	0	27932
55 - 59	0	0	0	0	0	5	98	3492	18120	3077	117	0	0	0	24909
60 - 64	0	0	0	0	0	0	12	119	2992	19501	4161	1	0	0	26786
65 - 74	0	0	0	0	0	0	0	0	103	4090	60302	3596	0	0	68091
75 - 84	0	0	0	0	0	0	0	0	0	3	3301	33703	2035	0	39042
85 - 94	0	0	0	0	0	0	0	0	0	0	7	1926	15982	346	18261
95 +	0	0	0	0	0	0	0	0	0	0	0	2	333	1009	1344
COLUMN TOTALS:	0	816	9407	46884	36602	33407	27627	27935	24859	26777	67889	39228	18350	1355	361136
BIASES:	99.99	0.91	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	

PERCENT CORRECT: 81.3926
 HEIDKE SKILL SCORE: 0.79136
 CHI SCORE: 20.82

CASES = 361136

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 14	0	706	39	0	0	0	0	0	0	0	0	0	0	0	745
15 - 24	0	110	8122	1508	0	0	0	0	0	0	0	0	0	0	9740
25 - 34	0	0	1246	41773	3619	67	0	0	0	0	0	0	0	0	46705
35 - 39	0	0	0	3566	28747	4190	90	2	0	0	0	0	0	0	36595
40 - 44	0	0	0	36	4161	25269	3808	125	1	0	0	0	0	0	33400
45 - 49	0	0	0	1	74	3774	20077	3570	88	2	0	0	0	0	27586
50 - 54	0	0	0	0	1	102	1542	20627	3555	104	1	0	0	0	27932
55 - 59	0	0	0	0	0	5	98	3492	18120	3077	117	0	0	0	24909
60 - 64	0	0	0	0	0	0	12	119	2992	19501	4161	1	0	0	26786
65 - 74	0	0	0	0	0	0	0	0	103	4090	60302	3596	0	0	68091
75 - 84	0	0	0	0	0	0	0	0	0	3	3301	33703	2035	0	39042
85 - 94	0	0	0	0	0	0	0	0	0	0	7	1926	15982	346	18261
95 +	0	0	0	0	0	0	0	0	0	0	0	2	333	1009	1344
COLUMN TOTALS:	0	816	9407	46884	36602	33407	27627	27935	24859	26777	67889	39228	18350	1355	361136
BIASES:	99.99	0.91	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	

PERCENT CORRECT: 61.3926
HEIDKE SKILL SCORE: 0.79136
CHI SCORE: 20.82

CASES = 361136

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS
GEM	0 - 1	12031	9329	129	0	21489
	2 - 7	9301	115466	10281	16	135064
	8 - 15	76	10165	108846	7683	126773
	16 - 25	0	26	7218	53856	63392
	26 +	0	0	6	2092	14418
COLUMN TOTALS:	21408	134986	126480	63647	14615	361136
BIASES:	1.00	1.00	1.00	1.00	0.99	

PERCENT CORRECT: 83.7687

HEIDKE SKILL SCORE: 0.76852

CHI SCORE: 4.71

CASES = 361136

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS
PERSISTENCE	0 - 1	12031	9311	129	0	21471
	2 - 7	9301	115484	10281	16	135082
	8 - 15	76	10165	108846	7683	126773
	16 - 25	0	26	7218	53856	63392
	26 +	0	0	6	2092	14418
COLUMN TOTALS:	21408	134986	126480	63647	14615	361136
BIASES:	1.00	1.00	1.00	1.00	0.99	

PERCENT CORRECT: 83.7737

HEIDKE SKILL SCORE: 0.76858

CHI SCORE: 4.61

CASES = 361136

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
	0 - 1	5291	10268	29	0	15580
	2 - 9	10536	268535	14353	23	293447
GEM	10 - 19	3	14446	35453	1191	51093
	20 - 29	0	20	440	544	1008
	30 +	0	0	0	0	0
COLUMN TOTALS:	15830	293269	50275	1758	4	361136
BIASES:	0.98	1.00	1.02	0.57	0.00	

PERCENT CORRECT: 85.7912

HEIDKE SKILL SCORE: 0.55393

CHI SCORE: 341.08

CASES = 361136

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
	0 - 1	5303	10356	29	0	15688
	2 - 9	10524	268512	14450	24	293510
PERSISTENCE	10 - 19	3	14383	34833	969	50188
	20 - 29	0	18	962	762	1746
	30 +	0	0	1	3	4
COLUMN TOTALS:	15690	293269	50275	1758	4	361136
BIASES:	0.99	1.00	1.00	0.99	1.00	

PERCENT CORRECT: 85.6769

HEIDKE SKILL SCORE: 0.55060

CHI SCORE: 1.70

CASES = 361136

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
GEM	0 - 44	28418	6542	1070	497	342	239	1354	49848
	45 - 89	6583	12861	2914	569	281	194	951	26453
	90 - 134	795	2613	9884	2972	945	322	795	19346
	135 - 179	421	576	2450	12304	6243	747	1185	24805
	180 - 224	359	318	672	5511	42775	7983	2495	61103
	225 - 269	274	236	402	985	7421	14299	4451	29240
	270 - 314	1198	890	860	1097	2117	4567	33455	55150
	315 - 359	11867	2340	1126	995	842	934	10388	95191
COLUMN TOTALS:		49915	26376	19378	24930	60966	29285	55074	361136
BIASES:		1.00	1.00	1.00	0.99	1.00	1.00	1.00	

PERCENT CORRECT: 61.1113
HEIDKE SKILL SCORE: 0.53706
CHI SCORE: 1.48

CASES = 361136

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
PERSISTENCE	0 - 44	28418	6542	1070	497	342	239	1354	49848
	45 - 89	6583	12861	2914	569	281	194	951	26453
	90 - 134	795	2613	9884	2972	945	322	795	19346
	135 - 179	421	576	2450	12304	6243	747	1185	24805
	180 - 224	359	318	672	5511	42775	7983	2495	61103
	225 - 269	274	236	402	985	7421	14299	4451	29240
	270 - 314	1198	890	860	1097	2117	4567	33455	55150
	315 - 359	11867	2340	1126	995	842	934	10388	95191
COLUMN TOTALS:		49915	26376	19378	24930	60966	29285	55074	361136
BIASES:		1.00	1.00	1.00	0.99	1.00	1.00	1.00	

PERCENT CORRECT: 61.1113
HEIDKE SKILL SCORE: 0.53706
CHI SCORE: 1.48

CASES = 361136

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS
0 - 100	517	304	29	52	1	142	181	1226
200 - 400	255	9773	1018	299	149	662	365	12521
500 - 900	60	1313	9641	1008	151	348	293	12814
SEM 1000 - 2900	24	331	1145	24889	2743	1563	222	30917
3000 - 6000	18	169	134	2682	54177	8239	163	65582
CLR BELOW 6001	162	532	257	1875	8382	218850	866	230924
X/-X	210	463	142	202	126	888	5121	7152
COLUMN TOTALS:	1246	12885	12366	31007	65729	230692	7211	361136
BIASES:	0.98	0.97	1.04	1.00	1.00	1.00	0.99	

PERCENT CORRECT: 89.4311

HEIDKE SKILL SCORE: 0.80723

CHI SCORE: 28.14

THREAT SCORE: 0.63709

CASES = 361136

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS
0 - 100	517	304	29	52	1	142	181	1226
200 - 400	270	9811	1327	308	149	661	363	12889
500 - 900	43	1274	9271	997	151	349	229	12314
PERSISTENCE 1000 - 2900	24	330	1154	24891	2743	1563	223	30928
3000 - 6000	18	169	134	2681	54159	8239	161	65561
CLR BELOW 6001	162	531	257	1876	8396	218796	846	230864
X/-X	212	466	194	202	130	942	5208	7354
COLUMN TOTALS:	1246	12885	12366	31007	65729	230692	7211	361136
BIASES:	0.98	1.00	1.00	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 89.3439

HEIDKE SKILL SCORE: 0.89563

CHI SCORE: 4.14

THREAT SCORE: 0.62857

CASES = 361136

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	680	140	39	49	0	316	1224
200 - 400	130	1136	208	61	9	318	1862
500 - 900	38	163	1947	757	78	1219	4202
GEM 1000 - 2900	46	65	826	8156	1297	3227	13617
3000 - 6000	0	11	73	1289	31528	12714	45615
CLR BELOW 6001	302	330	1182	3288	10360	279154	294616
COLUMN TOTALS:	1196	1845	4275	13600	43272	296948	361136
BIASES:	1.02	1.01	0.98	1.00	1.05	0.99	

PERCENT CORRECT: 89.3295
HEIDKE SKILL SCORE: 0.65851
CHI SCORE: 147.26
THREAT SCORE: 0.51621

CASES = 361136

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	680	140	39	49	0	316	1224
200 - 400	130	1136	208	61	9	318	1862
500 - 900	38	163	1957	771	78	1219	4226
PERSISTENCE 1000 - 2900	46	65	816	8145	1300	3227	13599
3000 - 6000	0	11	73	1275	30465	11411	43235
CLR BELOW 6001	302	330	1182	3299	11420	280457	296990
COLUMN TOTALS:	1196	1845	4275	13600	43272	296948	361136
BIASES:	1.02	1.01	0.99	1.00	1.00	1.00	

PERCENT CORRECT: 89.3957
HEIDKE SKILL SCORE: 0.65554
CHI SCORE: 1.41
THREAT SCORE: 0.51621

CASES = 361136

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	0	0	0	7	0	19	26
200 - 400	0	0	0	0	0	0	0
500 - 900	1	9	504	58	416	1105	2093
1000 - 2900	4	86	45	585	478	1663	2861
3000 - 6000	5	196	650	591	7519	9657	18618
CLR BELOW 6001	42	374	1241	1649	7193	327039	337536
COLUMN TOTALS:	52	665	2440	2890	15606	339483	361136
BIASES:	0.50	0.00	0.86	0.99	1.19	0.99	

PERCENT CORRECT: 92.9420
 HEIDKE SKILL SCORE: 0.40716
 CHI SCORE: 1320.11
 THREAT SCORE: 0.00000

CASES = 361136

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	0	0	15	8	0	32	55
200 - 400	2	29	17	57	126	446	677
500 - 900	1	10	544	59	526	1286	2426
1000 - 2900	5	70	110	551	466	1649	2851
3000 - 6000	5	127	551	544	6595	7825	15647
CLR BELOW 6001	39	429	1203	1671	7893	328245	339480
COLUMN TOTALS:	52	665	2440	2890	15606	339483	361136
BIASES:	1.06	1.02	0.99	0.99	1.00	1.00	

PERCENT CORRECT: 93.0298
 HEIDKE SKILL SCORE: 0.39042
 CHI SCORE: 1.1
 THREAT SCORE: 0.02186

CASES = 361136

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
CLR BELOW 6001	218577	11943	207	46	230773
SCT	11831	51961	8096	2665	74553
BKN	102	5541	6607	5117	17367
OVC	0	2891	5021	30531	38443
COLUMN TOTALS:	230510	72336	19931	38359	361136
BIASES:	1.00	1.03	0.87	1.00	

PERCENT CORRECT: 85.1967
HEIDKE SKILL SCORE: 0.72424
CHI SCORE: 398.27

CASES = 361136

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
CLR BELOW 6001	218002	11941	168	0	230111
SCT	12335	50161	7546	2789	72831
BKN	173	7384	7262	5052	19871
OVC	0	2850	4955	30518	38323
COLUMN TOTALS:	230510	72336	19931	38359	361136
BIASES:	1.00	1.01	1.00	1.00	

PERCENT CORRECT: 84.7168
HEIDKE SKILL SCORE: 0.71624
CHI SCORE: 4.29

CASES = 361136

CLOUD COVER TWO

VERIFYING OBSERVATION

	CLR BELOW	6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	283211	8931	3502	4095	299739
GEM	SCT	8940	13662	5220	771	28593
	BKN	2744	3685	7360	3784	17573
	OVC	4410	1040	3137	6644	15231
	COLUMN TOTALS:	299305	27318	19219	15294	361136
	BIASES:	1.00	1.05	0.91	1.00	

PERCENT CORRECT: 86.0831
HEIDKE SKILL SCORE: 0.53879
CHI SCORE: 201.37

CASES = 361136

CLOUD COVER TWO

VERIFYING OBSERVATION

	CLR BELOW	6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	282531	8759	3462	4082	298834
PERSISTENCE	SCT	8961	12704	5067	1158	27890
	BKN	3403	4815	7553	3410	19181
	OVC	4410	1040	3137	6644	15231
	COLUMN TOTALS:	299305	27318	19219	15294	361136
	BIASES:	1.00	1.02	1.00	1.00	

PERCENT CORRECT: 85.6830
HEIDKE SKILL SCORE: 0.52864
CHI SCORE: 13.05

CASES = 361136

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW	6001	SCT	BKN	OVC	ROW TOTALS
GEM	CLR BELOW 6001	324207	3950	3755	3551	335463
	SCT	3800	1830	1351	232	7213
	BKN	3743	1368	2716	1454	9281
	OVC	3721	234	1276	3948	9179
	COLUMN TOTALS:	335471	7382	9098	9185	361136
	BIASES:	1.00	0.98	1.02	1.00	

PERCENT CORRECT: 92.1262
HEIDKE SKILL SCORE: 0.41849
CHI SCORE: 7.55

CASES = 361136

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW	6001	SCT	BKN	OVC	ROW TOTALS
PERSISTENCE	CLR BELOW 6001	324179	3936	3750	3550	335415
	SCT	3882	1881	1421	258	7442
	BKN	3689	1331	2651	1429	9100
	OVC	3721	234	1276	3948	9179
	COLUMN TOTALS:	335471	7382	9098	9185	361136
	BIASES:	1.00	1.01	1.00	1.00	

PERCENT CORRECT: 92.1146
HEIDKE SKILL SCORE: 0.41816
CHI SCORE: 0.50

CASES = 361136

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
	0 < 1/2	869	167	138	26	6	1214
	1/2 < 1	241	1144	526	60	11	1986
GEM	1 < 3	123	658	11754	3126	270	16177
	3 < 5	23	103	4161	23123	4860	33298
	5 < 7	8	33	515	6232	22385	35029
	7 +	10	19	253	968	6592	273432
COLUMN TOTALS:	1274	2124	17347	33537	34124	272730	361136
BIASES:	0.95	0.94	0.93	0.99	1.03	1.00	

PERCENT CORRECT: 89.9564

HEIDKE SKILL SCORE: 0.75400

CHI SCORE: 118.22

THREAT SCORE: 0.97960

CASES = 361136

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
	0 < 1/2	890	226	197	50	6	1376
	1/2 < 1	227	1139	659	99	21	2152
PERSISTENCE	1 < 3	124	632	11970	3940	395	17323
	3 < 5	21	83	3828	22942	5474	33615
	5 < 7	8	25	423	5503	21958	34137
	7 +	4	19	270	1003	6270	272533
COLUMN TOTALS:	1274	2124	17347	33537	34124	272730	361136
BIASES:	1.08	1.01	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 89.6796

HEIDKE SKILL SCORE: 0.74638

CHI SCORE: 8.98

THREAT SCORE: 0.99651

CASES = 361136

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS	
	0 - 10	312864	13513	1728	31	8	328144
	11 - 20	9285	9429	2666	16	0	21396
GEM	21 - 30	1663	2693	5801	462	7	10626
	31 - 40	33	31	468	426	12	970
	41 +	0	0	0	0	0	0
	COLUMN TOTALS:	323845	25666	10663	935	27	361136
	BIASES:	1.01	0.83	1.00	1.04	0.00	

PERCENT CORRECT: 90.9685
HEIDKE SKILL SCORE: 0.49852
CHI SCORE: 795.90

CASES = 361136

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS	
	0 - 10	310262	12009	1693	34	8	324006
	11 - 20	11889	10934	2718	15	0	25556
PERSISTENCE	21 - 30	1661	2692	5784	460	7	10604
	31 - 40	24	31	468	408	12	943
	41 +	9	0	0	18	0	27
	COLUMN TOTALS:	323845	25666	10663	935	27	361136
	BIASES:	1.00	1.00	0.99	1.01	1.00	

PERCENT CORRECT: 90.6550
HEIDKE SKILL SCORE: 0.50701
CHI SCORE: 0.95

CASES = 361136

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	637	241	58	16	0	178	1130
200 - 400	280	8304	824	218	35	253	9914
500 - 900	6	863	7691	562	58	309	9589
GEM 1000 - 2900	0	161	1024	18602	1229	1454	22470
3000 - 6000	1	1	19	1161	37276	5720	44178
CLR BELOW 6001	125	289	257	1180	4154	267850	273855
COLUMN TOTALS.	1049	9859	9873	21839	42752	275764	361136
BIASES:	1.08	1.01	0.97	1.03	1.03	0.99	

PERCENT CORRECT: 94.2470

REPERT SKILL SCORE: 0.85661

CHI SCORE: 93.74

THREAT SCORE: 75757

CASES = 361136

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	588	310	42	18	0	134	1092
200 - 400	253	7951	1060	289	31	254	9841
500 - 900	35	1010	7204	999	36	461	9745
PERSISTENCE 1000 - 2900	15	276	1220	17130	1376	1785	21544
3000 - 6000	1	5	61	1645	34855	6159	42706
CLR BELOW 6001	157	307	286	1758	6402	266969	275879
COLUMN TOTALS	1049	9859	9873	21839	42752	275764	361136
BIASES:	1.04	1.00	0.99	1.00	1.00	1.00	

PERCENT CORRECT: 92.6789

REPERT SKILL SCORE: 0.81581

CHI SCORE: 1104

THREAT SCORE: 71455

CASES = 361136

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

		CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	218527	11335	473	77	230412
	SCT	11889	28614	8099	1540	50142
GEM	BKN	94	3796	8124	6769	18783
	OVC	0	1509	5838	54452	61799
	COLUMN TOTALS:	230510	45254	22534	62838	361136
	BIASES:	1.00	1.11	0.83	0.98	

PERCENT CORRECT: 85.7619
HEIDKE SKILL SCORE: 0.73747
CHI SCORE: 1169.58

CASES = 361136

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

		CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	218002	11570	539	0	230111
	SCT	12006	25391	6601	1770	45768
PERSISTENCE	BKN	502	6568	9097	6357	22524
	OVC	0	1725	6297	54711	62733
	COLUMN TOTALS:	230510	45254	22534	62838	361136
	BIASES:	1.00	1.01	1.00	1.00	

PERCENT CORRECT: 85.0652
HEIDKE SKILL SCORE: 0.72510
CHI SCORE: 6.01

CASES = 361136

GEM VS. PERSISTENCE 30 MINUTE PROJECTION

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTALS
0 - 29.235	0	31	0	0	0	0	0	0	0	31
29.236 - 29.530	30	3681	166	0	0	0	0	0	0	3877
29.531 - 29.677	0	134	12481	591	0	0	0	0	0	13206
29.678 - 29.825	0	0	624	39275	2202	0	0	0	0	42101
29.826 - 29.973	0	0	0	2249	85143	2274	0	0	0	89666
29.974 - 30.120	0	0	0	0	2337	89761	2186	0	0	94284
30.121 - 30.268	0	0	0	0	0	2245	74854	1202	0	78301
30.269 - 30.563	0	0	0	0	0	0	1167	35675	86	36928
30.564 +	0	0	0	0	0	0	0	72	1961	2033
COLUMN TOTALS:	30	3846	13271	42115	89682	94280	78207	36949	2047	360427
BIASES:	1.00	1.01	1.00	1.00	1.00	1.00	1.00	1.00	0.99	

PERCENT CORRECT: 95.1190
 RESIDUE SPREAD SCORE: 0.938874
 CRP SCORE: 0.99

CASES = 360427

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTALS
0 - 29.235	0	31	0	0	0	0	0	0	0	31
29.236 - 29.530	30	3681	166	0	0	0	0	0	0	3877
29.531 - 29.677	0	134	12481	591	0	0	0	0	0	13206
29.678 - 29.825	0	0	624	39275	2202	0	0	0	0	42101
29.826 - 29.973	0	0	0	2249	85143	2274	0	0	0	89666
29.974 - 30.120	0	0	0	0	2337	89761	2186	0	0	94284
30.121 - 30.268	0	0	0	0	0	2245	74854	1202	0	78301
30.269 - 30.563	0	0	0	0	0	0	1167	35675	86	36928
30.564 +	0	0	0	0	0	0	0	72	1961	2033
COLUMN TOTALS:	30	3846	13271	42115	89682	94280	78207	36949	2047	360427
BIASES:	1.00	1.01	1.00	1.00	1.00	1.00	1.00	1.00	0.99	

PERCENT CORRECT: 95.1190
 RESIDUE SPREAD SCORE: 0.938874
 CRP SCORE: 0.99

VERIFYING OBSERVATION

AGE	5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 14	0	642	37	0	0	0	0	0	0	0	0	0	0	0	679
15 - 24	0	134	7628	1914	2	0	0	0	0	0	0	0	0	0	9678
25 - 34	0	0	1565	40272	4512	253	2	0	0	0	0	0	0	0	46604
35 - 39	0	0	0	4506	26696	5042	275	11	1	0	0	0	0	0	36531
40 - 44	0	0	0	80	5267	23304	4433	313	15	0	0	0	0	0	33412
45 - 49	0	0	0	7	165	4549	18350	4259	229	15	0	0	0	0	27574
50 - 54	0	0	0	0	7	204	4393	18922	4177	231	13	0	0	0	27947
55 - 59	0	0	0	0	0	19	176	4223	16594	3658	258	0	0	0	24928
60 - 64	0	0	0	0	0	0	24	247	3603	17831	5076	7	0	0	26788
65 - 74	0	0	0	0	0	0	0	10	210	4945	58187	4657	0	0	68009
75 - 84	0	0	0	0	0	0	0	0	1	7	4204	32021	2564	0	38797
85 - 94	0	0	0	0	0	0	0	0	0	0	10	2407	15321	406	18144
95 +	0	0	0	0	0	0	0	0	0	0	0	4	387	945	1336
COLUMN TOTALS:	0	776	9230	46779	36649	33371	27653	27985	24830	26687	67748	38096	18272	1351	360427
BIASES:	99.99	9.86	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99	

PERCENT CORRECT: 76.7737
HEIDKE SKILL SCORE: 0.73955
CHI SCORE: 40.36

CASES = 350427

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	< 5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
< 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 14	0	642	37	0	0	0	0	0	0	0	0	0	0	0	679
15 - 24	0	134	7628	1914	2	0	0	0	0	0	0	0	0	0	9678
25 - 34	0	0	1565	40272	4512	253	2	0	0	0	0	0	0	0	46604
35 - 39	0	0	0	4506	26696	5042	275	11	1	0	0	0	0	0	36531
40 - 44	0	0	0	80	5267	23304	4433	313	15	0	0	0	0	0	33412
45 - 49	0	0	0	7	165	4549	18350	4259	229	15	0	0	0	0	27574
50 - 54	0	0	0	0	7	204	4393	18922	4177	231	13	0	0	0	27947
55 - 59	0	0	0	0	0	19	176	4223	16594	3658	258	0	0	0	24928
60 - 64	0	0	0	0	0	0	24	247	3603	17831	5076	7	0	0	26788
65 - 74	0	0	0	0	0	0	0	10	210	4945	58187	4657	0	0	68009
75 - 84	0	0	0	0	0	0	0	0	1	7	4204	32021	2564	0	38797
85 - 94	0	0	0	0	0	0	0	0	0	0	10	2407	15321	406	18144
95 +	0	0	0	0	0	0	0	0	0	0	0	4	387	945	1336
COLUMN TOTALS:	0	776	9230	46779	36649	33371	27653	27985	24830	26687	67748	39096	18272	1351	360427
BIASES:	99.99	0.88	1.05	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99	

PERCENT CORRECT: 76.7737
 HEIDKE SKILL SCORE: 0.73955
 CHI SCORE: 40.36

CASES = 360427

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

		0-1	2-7	8-15	16-25	26 +	ROW TOTALS
GEM	0 - 1	10086	11486	346	2	0	21920
	2 - 7	10948	111522	12152	44	0	134666
	8 - 15	251	12012	105052	9338	12	126665
	16 - 25	0	72	8676	51406	2792	62946
	26 +	0	0	11	2475	11744	14230
COLUMN TOTALS:		21285	135092	126237	63265	14548	360427
BIASES:		1.03	1.00	1.00	0.99	0.98	

PERCENT CORRECT: 80.4074
HEIDKE SKILL SCORE: 0.72052
CHI SCORE: 30.30

CASES = 360427

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

		0-1	2-7	8-15	16-25	26 +	ROW TOTALS
PERSISTENCE	0 - 1	10032	11061	334	2	0	21429
	2 - 7	11002	111947	12164	44	0	135157
	8 - 15	251	12012	105052	9338	12	126665
	16 - 25	0	72	8676	51406	2792	62946
	26 +	0	0	11	2475	11744	14230
COLUMN TOTALS:		21285	135092	126237	63265	14548	360427
BIASES:		1.01	1.00	1.00	0.99	0.98	

PERCENT CORRECT: 80.5103
HEIDKE SKILL SCORE: 0.72182
CHI SCORE: 11.02

CASES = 360427

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
0 - 1	4532	10052	35	0	0	14619
2 - 9	11276	267094	15502	28	0	293900
GEM 10 - 19	4	15470	34284	1293	0	51051
20 - 29	0	16	392	445	4	857
30 +	0	0	0	0	0	0
COLUMN TOTALS:	15812	292632	50213	1766	4	360427
BIASES:	0.92	1.00	1.02	0.49	0.00	

PERCENT CORRECT: 84.9978
HEIDKE SKILL SCORE: 0.52590
CHI SCORE: 581.37

CASES = 360427

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
0 - 1	4716	10982	40	0	0	15738
2 - 9	11092	266237	15612	29	0	292970
PERSISTENCE 10 - 19	4	15393	33563	1011	0	49971
20 - 29	0	20	998	722	4	1744
30 +	0	0	0	4	0	4
COLUMN TOTALS:	15812	292632	50213	1766	4	360427
BIASES:	1.00	1.00	1.00	0.99	1.00	

PERCENT CORRECT: 84.6879
HEIDKE SKILL SCORE: 0.51969
CHI SCORE: 2.18

CASES = 360427

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
GEM	0 - 44	26965	6744	1236	584	445	350	1703	49743
	45 - 89	6464	11611	3092	673	405	250	1279	26361
	90 - 134	1000	2601	8644	3174	985	437	1146	19241
	135 - 179	478	651	2504	10719	6704	851	1615	24779
	180 - 224	434	420	797	5705	40535	8611	3031	60912
	225 - 269	364	289	506	1114	7863	12950	4778	29280
	270 - 314	1569	1186	1120	1627	2644	4677	30206	55051
	315 - 359	12573	2776	1348	1305	1185	1200	11175	96053
COLUMN TOTALS:		49847	26278	19247	24901	60766	29326	54936	360427
BIASES:		1.00	1.00	1.00	1.00	1.00	1.00	1.01	0.99

PERCENT CORRECT: 56.7846
HEIDKE SKILL SCORE: 0.48562
CHI SCORE: 11.42

CASES = 360427

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
PERSISTENCE	0 - 44	26965	6744	1236	584	445	350	1703	49743
	45 - 89	6464	11611	3092	673	405	250	1279	26361
	90 - 134	1000	2601	8644	3174	985	437	1146	19241
	135 - 179	478	651	2504	10719	6704	851	1615	24779
	180 - 224	434	420	797	5705	40535	8611	3031	60912
	225 - 269	364	289	506	1114	7863	12953	4781	29280
	270 - 314	1569	1186	1120	1627	2644	4674	30206	55051
	315 - 359	12573	2776	1348	1305	1185	1200	11175	96053
COLUMN TOTALS:		49847	26278	19247	24901	60766	29326	54936	360427
BIASES:		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

PERCENT CORRECT: 56.9131
HEIDKE SKILL SCORE: 0.48705
CHI SCORE: 1.80

CASES = 360427

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X-Y-X	ROW TOTALS
0 - 100	327	280	25	61	10	203	212	1113
200 - 400	328	8790	1252	166	107	854	457	11986
500 - 900	70	1527	8245	703	155	507	309	11321
1000 - 2900	42	733	2038	23001	2392	2221	446	30874
3000 - 6000	30	289	275	4248	52701	11353	260	63036
CLR BELOW 6001	204	653	352	2569	10277	213591	971	228717
X-Y-X	240	577	212	194	139	1038	4496	1886
COLUMN TOTALS:	1241	12859	12400	30942	65772	230061	7152	360427
BIASES:	0.98	0.93	0.93	1.00	1.05	0.99	1.96	

PERCENT CORRECT: 86.3561
 HEIGHT SKILL SCORE: 0.75184
 CHI SCORE: 381.69
 THREAT SCORE: 1.55746

CASES = 360427

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X-Y-X	ROW TOTALS
0 - 100	339	361	26	61	10	203	232	1132
200 - 400	335	8991	1701	398	184	572	418	12899
500 - 900	65	1595	8308	1301	225	510	302	12306
PERSISTENCE 1000 - 2900	39	420	1559	22976	3372	2261	277	30905
3000 - 6000	15	221	183	3324	50555	11039	231	65568
CLR BELOW 6001	205	668	354	2621	11231	214130	974	230183
X-Y-X	243	603	269	261	194	1046	4018	7334
COLUMN TOTALS:	1241	12859	12400	30942	65772	230061	7152	360427
BIASES:	0.99	1.00	0.99	1.00	1.00	1.00	1.02	

PERCENT CORRECT: 86.0138
 HEIGHT SKILL SCORE: 0.74621
 CHI SCORE: 381.69
 THREAT SCORE: 1.55746

CASES = 360427

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS	
GEM	0 - 100	541	147	56	36	0	376	1156
	200 - 400	178	962	231	78	15	359	1823
	500 - 900	47	193	1537	857	107	1372	4113
	1000 - 2900	78	111	931	6992	1506	4145	13763
	3000 - 6000	0	22	92	1426	27100	14151	42791
	CLR BELOW 6001	336	400	1388	4202	14579	275876	296781
	COLUMN TOTALS:	1180	1835	4235	13591	43307	296279	360427
	BIASES:	0.98	0.99	0.97	1.01	0.99	1.00	

PERCENT CORRECT: 86.8437

HEIDKE SKILL SCORE: 0.57182

CHI SCORE: 13.26

THREAT SCORE: 0.43879

CASES = 360427

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS	
	0 - 100	560	147	56	52	0	390	1205
	200 - 400	176	971	231	85	15	366	1844
	500 - 900	47	193	1576	899	107	1389	4211
PERSISTENCE	1000 - 2900	61	101	893	6917	1503	4107	13582
	3000 - 6000	0	23	97	1462	27088	14547	43217
	CLR BELOW 6001	336	400	1382	4176	14594	275480	296368
	COLUMN TOTALS:	1180	1835	4235	13591	43307	296279	360427
	BIASES:	1.02	1.00	0.99	1.00	1.00	1.00	

PERCENT CORRECT: 86.7232

HEIDKE SKILL SCORE: 0.56920

CHI SCORE: 0.93

THREAT SCORE: 0.44038

CASES = 360427

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	0	1	0	0	1	48	50
200 - 400	0	0	0	0	0	0	0
500 - 900	2	4	323	41	19	338	707
1000 - 2900	4	58	46	510	489	2034	3141
3000 - 6000	6	214	618	550	6524	11957	19869
CLR BELOW 6001	40	385	1459	1766	8563	324427	338640
COLUMN TOTALS:	52	662	2446	2867	15596	338804	360427
BIASES:	0.96	0.00	0.30	1.10	1.27	0.99	

PERCENT CORRECT: 92.0530
 HEIDKE SKILL SCORE: 0.33533
 CHI SCORE: 3080.88
 THREAT SCORE: 0.0131

CASES = 360427

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	1	0	6	2	1	42	52
200 - 400	1	24	21	30	131	468	675
500 - 900	2	12	420	82	482	1434	2432
1000 - 2900	4	53	130	416	418	1832	2853
3000 - 6000	6	133	495	487	5190	9325	15636
CLR BELOW 6001	38	440	1374	1850	9374	325703	338779
COLUMN TOTALS:	52	662	2446	2867	15596	338804	360427
BIASES:	1.00	1.02	0.99	1.00	1.00	1.00	

PERCENT CORRECT: 92.0447
 HEIDKE SKILL SCORE: 0.30499
 CHI SCORE: 0.51
 THREAT SCORE: 0.0189

CASES = 360427

CLOUD COVER ONE

VERIFYING OBSERVATION

		CLR BELOW				ROW TOTALS
		6001	SCT	BKN	OVC	
GEM	CLR BELOW 6001	213580	15238	679	166	229663
	SCT	15867	47947	9033	4938	77785
	BKN	79	4818	4479	4531	13907
	OVC	108	4556	5692	28716	39072
COLUMN TOTALS:		229634	72559	19883	38351	360427
BIASES:		1.00	1.07	0.70	1.02	

PERCENT CORRECT: 81.7702
HEIDKE SKILL SCORE: 0.66048
CHI SCORE: 2186.09

CASES = 360427

CLOUD COVER ONE

VERIFYING OBSERVATION

		CLR BELOW				ROW TOTALS
		6001	SCT	BKN	OVC	
PERSISTENCE	CLR BELOW 6001	213158	15504	632	134	229428
	SCT	15687	44859	7784	4451	72781
	BKN	673	7776	6075	5367	19891
	OVC	116	4420	5392	28399	38327
COLUMN TOTALS:		229634	72559	19883	38351	360427
BIASES:		1.00	1.00	1.00	1.00	

PERCENT CORRECT: 81.1512
HEIDKE SKILL SCORE: 0.65056
CHI SCORE: 0.88

CASES = 360427

CLOUD COVER TWO

VERIFYING OBSERVATION

		CLR BELOW				ROW TOTALS
		6001	SCT	BKN	OVC	
GEN	CLR BELOW 6001	277469	11017	4934	4842	298362
	SCT	12380	11703	5338	1554	30975
	BKN	3376	3369	5713	3349	15807
	OVC	5152	1480	3179	5572	15383
COLUMN TOTALS:		298377	27569	19164	15317	360427
BIASES:		1.00	1.12	0.82	1.00	

PERCENT CORRECT: 83.3614
 HEIDKE SKILL SCORE: 0.45307
 CHI SCORE: 1009.17

CASES = 360427

CLOUD COVER TWO

VERIFYING OBSERVATION

		CLR BELOW				ROW TOTALS
		6001	SCT	BKN	OVC	
PERSISTENCE	CLR BELOW 6001	277305	11046	5002	4823	298176
	SCT	11209	10333	4642	1681	27865
	BKN	4725	4737	6403	3286	19151
	OVC	5138	1453	3117	5527	15235
COLUMN TOTALS:		298377	27569	19164	15317	360427
BIASES:		1.00	1.01	1.00	0.99	

PERCENT CORRECT: 83.1148
 HEIDKE SKILL SCORE: 0.44566
 CHI SCORE: 3.76

CASES = 360427

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW	6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	322215	4784	4856	4363	336218
GEN	SCT	3429	1128	1057	332	5946
	BKN	4738	1123	1958	1287	9106
	OVC	4355	377	1248	3177	9157
	COLUMN TOTALS:	334737	7412	9119	9159	360427
	BIASES:	1.00	0.80	1.00	1.00	

PERCENT CORRECT: 91.1358
HEIDKE SKILL SCORE: 0.32863
CHI SCORE: 296.53

CASES = 360427

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW	6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	321132	4543	4720	4327	334722
PERSISTENCE	SCT	4511	1374	1199	370	7454
	BKN	4742	1118	1952	1285	9097
	OVC	4352	377	1248	3177	9154
	COLUMN TOTALS:	334737	7412	9119	9159	360427
	BIASES:	1.00	1.01	1.00	1.00	

PERCENT CORRECT: 90.9019
HEIDKE SKILL SCORE: 0.30005
CHI SCORE: 0.29

CASES = 360427

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
GEM	0 < 1/2	787	216	228	93	6	1341
	1/2 < 1	242	942	508	86	17	1795
	1 < 3	169	701	10649	3696	437	15992
	3 < 5	42	177	4749	21250	5613	33521
	5 < 7	18	47	675	6960	20265	34935
	7 +	5	31	419	1464	7770	12948
COLUMN TOTALS:	1263	2114	17228	33540	34118	272164	360427
BIASES:	1.06	0.85	0.93	1.00	1.02	1.00	

PERCENT CORRECT: 87.9648

HEIDKE SKILL SCORE: 0.70530

CHI SCORE: 163.87

THREAT SCORE: 50590

CASES = 360427

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
PERSISTENCE	0 < 1/2	788	222	249	92	6	1371
	1/2 < 1	254	1002	697	137	41	2140
	1 < 3	161	660	10946	4546	587	17303
	3 < 5	46	162	4320	21077	6014	33545
	5 < 7	6	37	593	6277	19951	34191
	7 +	8	31	423	1411	7519	27187
COLUMN TOTALS:	1263	2114	17228	33540	34118	272164	360427
BIASES:	1.09	1.01	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 87.7429

HEIDKE SKILL SCORE: 0.70135

CHI SCORE: 10.34

THREAT SCORE: 0.49026

CASES = 360427

GUSTS (KTS)

VERIFYING OBSERVATION

		0-10	11-20	21-30	31-40	41 +	ROW TOTALS
GEM	0 - 10	311676	13944	2016	28	6	327672
	11 - 20	9511	9802	2838	22	0	21173
	21 - 30	1973	2915	5764	881	17	11550
	31 - 40	8	0	5	19	0	32
	41 +	0	0	0	0	0	0
COLUMN TOTALS:		323168	25661	10623	950	25	360427
BIASES:		1.01	0.83	1.09	0.03	0.00	

PERCENT CORRECT: 90.5207

HEIDKE SKILL SCORE: 0.47258

CHI SCORE: 1840.68

CASES = 360427

GUSTS (KTS)

VERIFYING OBSERVATION

		0-10	11-20	21-30	31-40	41 +	ROW TOTALS
PERSISTENCE	0 - 10	308945	12461	1984	28	6	322424
	11 - 20	15346	19286	2457	22	0	36631
	21 - 30	1981	2893	5764	881	17	11534
	31 - 40	8	0	5	19	0	32
	41 +	0	0	0	0	0	0
COLUMN TOTALS:		326280	24640	10616	950	25	368511
BIASES:		1.01	0.83	1.09	0.03	0.00	

PERCENT CORRECT: 90.5207

HEIDKE SKILL SCORE: 0.47258

CHI SCORE: 1840.68

CASES = 360427

AD-A190 003

VERY SHORT RANGE STATISTICAL FORECASTING OF AUTOMATED
WEATHER OBSERVATION. (U) NATIONAL WEATHER SERVICE
SILVER SPRING MD TECHNIQUES DEVELOPH. R G MILLER

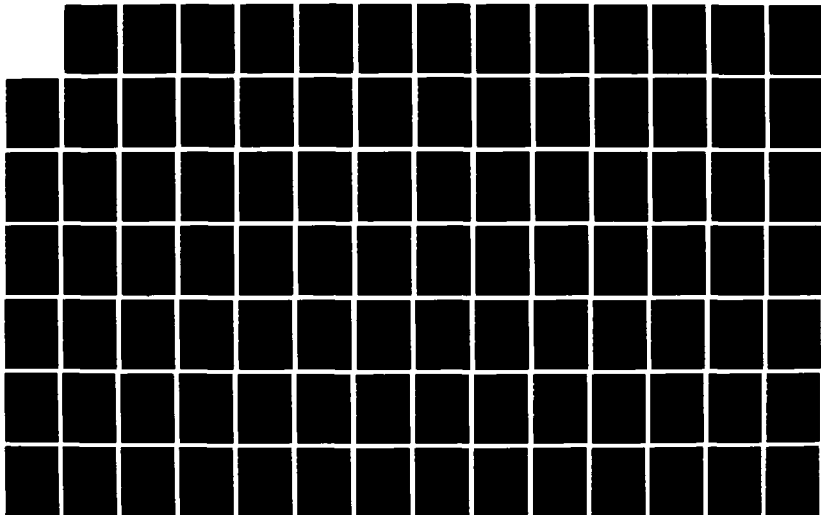
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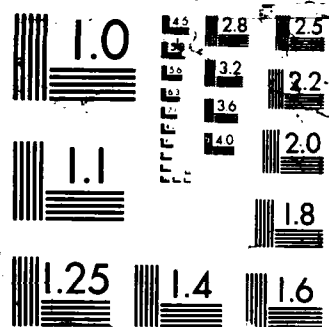
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NL





CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	463	326	62	29	2	266	1148
200 - 400	358	7478	1066	328	50	385	9665
500 - 900	18	1326	7003	943	114	562	9966
GEM 1000 - 2900	12	305	1364	16918	1592	2160	22351
3000 - 6000	3	3	38	1667	34248	7745	43704
CLR BELOW 6001	166	392	352	1934	6795	263954	273592
COLUMN TOTALS:	1020	9830	9885	21819	42801	275072	369427
BIASES:	1.13	0.98	1.01	1.02	1.02	0.99	

PERCENT CORRECT: 91.5758

HEIDKE SKILL SCORE: 0.78994

CHI SCORE: 59.47

THREAT SCORE: 0.66153

CASES = 369427

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	430	377	57	27	0	187	1078
200 - 400	336	7379	1357	365	51	366	9854
500 - 900	39	1236	6422	1271	110	702	9780
PERSISTENCE 1000 - 2900	4	389	1577	15722	1680	2416	21788
3000 - 6000	7	7	96	2039	32447	8170	42766
CLR BELOW 6001	204	442	376	2395	8513	263231	275161
COLUMN TOTALS:	1020	9830	9885	21819	42801	275072	369427
BIASES:	1.06	1.00	0.99	1.00	1.00	1.00	

PERCENT CORRECT: 90.3459

HEIDKE SKILL SCORE: 0.75750

CHI SCORE: 4.57

THREAT SCORE: 0.64268

CASES = 369427

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
CLR BELOW 6001	213791	14299	1709	406	230205
SCT	15266	24530	8706	4199	52701
BKN	295	3265	5016	6271	14847
OVC	282	3344	7097	51951	62674
COLUMN TOTALS:	229634	45438	22528	62827	360427
BIASES:	1.00	1.16	0.66	1.00	

PERCENT CORRECT: 81.9273
HEIDKE SKILL SCORE: 0.66640
CHI SCORE: 3781.60

CASES = 360427

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
CLR BELOW 6001	213158	14238	1687	345	229428
SCT	14477	21358	6407	3491	45733
BKN	1660	6432	7304	7154	22550
OVC	339	3410	7130	51837	62716
COLUMN TOTALS:	229634	45438	22528	62827	360427
BIASES:	1.00	1.01	1.00	1.00	

PERCENT CORRECT: 81.4746
HEIDKE SKILL SCORE: 0.65959
CHI SCORE: 2.32

CASES = 360427

GEM VS. PERSISTENCE 40 MINUTE PROJECTION

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTALS
GEM										
0 - 29.235	0	31	0	0	0	0	0	0	0	31
29.236 - 29.530	30	3614	219	0	0	0	0	0	0	3863
29.531 - 29.677	0	184	12236	752	0	0	0	0	0	13172
29.678 - 29.825	0	0	787	38408	2771	0	0	0	0	41966
29.826 - 29.973	0	0	0	2849	83485	2908	0	0	0	89242
29.974 - 30.120	0	0	0	0	2992	88197	2702	0	0	93891
30.121 - 30.268	0	0	0	0	0	2812	73711	1533	0	78056
30.269 - 30.563	0	0	0	0	0	0	1496	35137	114	36747
30.564 +	0	0	0	0	0	0	0	93	1939	2032
COLUMN TOTALS:	30	3829	13242	42009	89248	93917	77909	36763	2053	359000
BIASES:	1.03	1.01	0.99	1.00	1.00	1.00	1.00	1.00	0.99	

PERCENT CORRECT: 93.7958
HEIDKE SKILL SCORE: 0.92215
CHI SCORE: 1.26

CASES = 359000

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTALS
PERSISTENCE										
0 - 29.235	0	31	0	0	0	0	0	0	0	31
29.236 - 29.530	30	3614	219	0	0	0	0	0	0	3863
29.531 - 29.677	0	184	12236	752	0	0	0	0	0	13172
29.678 - 29.825	0	0	787	38408	2771	0	0	0	0	41966
29.826 - 29.973	0	0	0	2849	83485	2908	0	0	0	89242
29.974 - 30.120	0	0	0	0	2992	88197	2702	0	0	93891
30.121 - 30.268	0	0	0	0	0	2812	73711	1533	0	78056
30.269 - 30.563	0	0	0	0	0	0	1496	35137	114	36747
30.564 +	0	0	0	0	0	0	0	93	1939	2032
COLUMN TOTALS	30	3829	13242	42009	89248	93917	77909	36763	2053	359000
BIASES:	1.03	1.01	0.99	1.00	1.00	1.00	1.00	1.00	0.99	

PERCENT CORRECT: 93.7958
HEIDKE SKILL SCORE: 0.92215
CHI SCORE: 1.26

CASES = 359000

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 14	0	585	46	1	0	0	0	0	0	0	0	0	0	0	632
15 - 24	0	171	7165	2254	13	0	0	0	0	0	0	0	0	0	9603
25 - 34	0	0	1858	38743	5153	533	16	0	0	0	0	0	0	0	46303
35 - 39	0	0	0	5296	24926	5640	507	30	2	0	0	0	0	0	36401
40 - 44	0	0	0	147	6207	21499	4922	551	43	1	0	0	0	0	33370
45 - 49	0	0	0	15	268	5300	16730	4700	461	36	3	0	0	0	27513
50 - 54	0	0	0	0	24	323	5090	17467	4544	413	29	0	0	0	27890
55 - 59	0	0	0	0	2	24	306	4817	15246	4091	438	0	0	0	24924
60 - 64	0	0	0	0	0	2	44	382	4114	16415	5816	7	0	0	26780
65 - 74	0	0	0	0	0	0	0	20	309	5629	56076	5620	0	0	67654
75 - 84	0	0	0	0	0	0	0	0	2	12	4968	30505	3064	0	38551
85 - 94	0	0	0	0	0	0	0	0	0	0	25	2841	14708	456	18030
95 +	0	0	0	0	0	0	0	0	0	0	0	10	434	905	1349
COLUMN TOTALS:	0	756	9069	46456	36593	33321	27615	27967	24721	26597	67355	38983	18206	1361	359000
BIASES:	99.99	0.84	1.06	1.00	0.99	1.00	1.00	1.00	1.01	1.01	1.00	0.99	0.99	0.99	

PERCENT CORRECT: 72.6936
 HEIDKE SKILL SCORE: 0.69382
 CHI SCORE: 64.80

CASES = 359000

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	< 5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
< 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 14	0	585	46	1	0	0	0	0	0	0	0	0	0	0	632
15 - 24	0	171	7165	2254	13	0	0	0	0	0	0	0	0	0	9603
25 - 34	0	0	1858	38743	5153	533	16	0	0	0	0	0	0	0	46303
35 - 39	0	0	0	5296	24926	5640	507	30	2	0	0	0	0	0	36401
40 - 44	0	0	0	147	6207	21499	4922	551	43	1	0	0	0	0	33370
45 - 49	0	0	0	15	268	5300	16730	4700	461	36	3	0	0	0	27513
50 - 54	0	0	0	0	24	323	5090	17467	4544	413	29	0	0	0	27890
55 - 59	0	0	0	0	2	24	306	4817	15246	4091	438	0	0	0	24924
60 - 64	0	0	0	0	0	2	44	382	4114	16415	5816	7	0	0	26780
65 - 74	0	0	0	0	0	0	0	20	309	5629	56076	5620	0	0	67654
75 - 84	0	0	0	0	0	0	0	0	2	12	4968	30505	3064	0	38551
85 - 94	0	0	0	0	0	0	0	0	0	0	25	2841	14708	456	18030
95 +	0	0	0	0	0	0	0	0	0	0	0	10	434	905	1349
COLUMN TOTALS:	0	756	9069	46456	36593	33321	27615	27967	24721	26597	67355	38983	18206	1361	359000
BIASES:	99.99	0.84	1.06	1.00	0.99	1.00	1.00	1.00	1.01	1.01	1.00	0.99	0.99	0.99	

PERCENT CORRECT: 72.6936
HEIDKE SKILL SCORE: 0.69382
CHI SCORE: 64.80

CASES = 359000

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS						
GEN	0 - 1	8967	13648	430	4	0	23049					
	2 - 7	11898	107151	13962	96	2	133109					
	8 - 15	290	13711	101387	10874	18	126280					
	16 - 25	1	136	9937	49177	3261	62512					
	26 +	0	0	14	2818	11218	14050					
COLUMN TOTALS:							21156	134646	125730	62969	14499	359000
BIASES:							1.09	0.99	1.00	0.99	0.97	

PERCENT CORRECT: 77.4095

HEIDKE SKILL SCORE: 0.67812

CHI SCORE: 206.55

CASES = 359000

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS	
PERSISTENCE	0 - 1	8651	12230	475	6	0	21362
	2 - 7	12214	108569	13917	94	2	134796
	8 - 15	290	13711	101387	10874	18	126280
	16 - 25	1	136	9937	49177	3261	62512
	26 +	0	0	14	2818	11218	14050
COLUMN TOTALS:		21156	134646	125730	62969	14499	359000
BIASES:		1.01	1.00	1.00	0.99	0.97	

PERCENT CORRECT: 77.7164

HEIDKE SKILL SCORE: 0.68182

CHI SCORE: 21.80

CASES = 359000

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
	0 - 1	4181	9563	42	0	13786
	2 - 9	11499	265515	16349	33	293396
GEM	10 - 19	2	16300	33411	1321	51034
	20 - 29	0	34	335	411	784
	30 +	0	0	0	0	0
COLUMN TOTALS:	15682	291412	50137	1765	4	359000
BIASES:	0.88	1.01	1.02	0.44	0.00	

PERCENT CORRECT: 84.5454
HEIDKE SKILL SCORE: 0.50948
CHI SCORE: 808.03

CASES = 359000

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
	0 - 1	4471	11186	47	0	15704
	2 - 9	11209	264017	16516	33	291775
PERSISTENCE	10 - 19	2	16179	32583	1036	49800
	20 - 29	0	30	991	692	1717
	30 +	0	0	0	4	4
COLUMN TOTALS:	15682	291412	50137	1765	4	359000
BIASES:	1.00	1.00	0.99	0.97	1.00	

PERCENT CORRECT: 84.0565
HEIDKE SKILL SCORE: 0.50015
CHI SCORE: 4.05

CASES = 359000

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
GEM									
0 - 44	25694	6895	1359	658	536	427	1957	11973	49499
45 - 89	6589	10770	3170	719	437	306	1501	2750	26242
90 - 134	1089	2503	8032	3132	1146	508	1267	1501	19178
135 - 179	558	725	2432	9775	6720	980	2052	1428	24670
180 - 224	507	461	844	5663	39087	9019	3539	1635	60755
225 - 269	441	372	583	1229	8008	11963	5009	1527	29132
270 - 314	1905	1403	1338	1963	3072	4640	27756	13304	55381
315 - 359	12870	3059	1425	1591	1566	1336	11617	60679	94143
COLUMN TOTALS:	49653	26188	19183	24730	60572	29179	54698	94797	359000
BIASES:	1.00	1.00	1.00	1.00	1.00	1.00	1.01	0.99	

PERCENT CORRECT: 53.9710
HEIDKE SKILL SCORE: 0.45211
CHI SCORE: 14.40

CASES = 359000

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
PERSISTENCE									
0 - 44	25694	6895	1359	658	536	427	1957	11973	49499
45 - 89	6589	10770	3170	719	437	306	1501	2750	26242
90 - 134	1089	2503	8032	3132	1146	508	1267	1501	19178
135 - 179	558	725	2432	9775	6720	980	2052	1428	24670
180 - 224	507	461	844	5663	39087	9019	3539	1635	60755
225 - 269	441	372	583	1229	8008	11966	5010	1528	29137
270 - 314	1901	1403	1338	1963	3072	4637	27739	12715	54768
315 - 359	12874	3059	1425	1591	1566	1336	11633	61267	94751
COLUMN TOTALS:	49653	26188	19183	24730	60572	29179	54698	94797	359000
BIASES:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 54.1309
HEIDKE SKILL SCORE: 0.45389
CHI SCORE: 1.46

CASES = 359000

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS	
GEM	0 - 100	244	305	19	63	11	240	232	1114
	200 - 400	390	8074	1429	250	176	953	485	11757
	500 - 900	80	1877	7652	1032	232	609	376	11858
	1000 - 2900	48	752	2238	21174	2415	2561	472	29660
	3000 - 6000	17	350	305	4959	49833	12907	289	68660
	CLR BELOW 6001	208	758	421	3155	12834	210557	1039	228972
	X/-X	232	713	298	249	178	1122	4187	6979
	COLUMN TOTALS:	1219	12829	12362	30882	65679	228949	7080	359000
BIASES:	0.91	0.92	0.96	0.96	1.05	1.00	0.99		

PERCENT CORRECT: 84.0448
HEIDKE SKILL SCORE: 0.70908
CHI SCORE: 304.27
THREAT SCORE: 0.50335

CASES = 359000

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS	
PERSISTENCE	0 - 100	259	359	26	63	11	241	254	1213
	200 - 400	389	8418	1956	453	242	995	447	12900
	500 - 900	69	1812	7527	1519	291	615	383	12216
	1000 - 2900	49	464	1886	21648	3786	2712	332	30877
	3000 - 6000	6	283	192	3707	48257	12682	244	65371
	CLR BELOW 6001	208	760	421	3169	12882	210568	1040	229048
	X/-X	239	733	354	323	210	1136	4380	7375
	COLUMN TOTALS:	1219	12829	12362	30882	65679	228949	7080	359000
BIASES:	1.00	1.01	0.99	1.00	1.00	1.00	1.04		

PERCENT CORRECT: 83.8599
HEIDKE SKILL SCORE: 0.70629
CHI SCORE: 15.93
THREAT SCORE: 0.50304

CASES = 359000

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
GEM							
0 - 100	468	148	82	44	0	408	1150
200 - 400	211	850	219	108	32	452	1872
500 - 900	48	167	1331	957	124	1547	4174
1000 - 2900	90	174	906	6268	1620	4614	13672
3000 - 6000	0	23	89	1549	28615	26999	57275
CLR BELOW 6001	350	465	1588	4636	12883	260935	280857
COLUMN TOTALS:	1167	1827	4215	13562	43274	294955	359000
BIASES:	0.99	1.02	0.99	1.01	1.32	0.95	

PERCENT CORRECT: 83.1384
HEIDKE SKILL SCORE: 0.49875
CHI SCORE: 5206.42
THREAT SCORE: 0.38649

CASES = 359000

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
PERSISTENCE							
0 - 100	488	148	83	56	0	421	1196
200 - 400	208	868	216	111	28	437	1868
500 - 900	48	168	1351	978	125	1571	4241
1000 - 2900	73	155	894	6217	1616	4590	13545
3000 - 6000	0	23	98	1544	25087	16336	43088
CLR BELOW 6001	350	465	1573	4656	16418	271600	295062
COLUMN TOTALS:	1167	1827	4215	13562	43274	294955	359000
BIASES:	1.02	1.02	1.01	1.00	1.00	1.00	

PERCENT CORRECT: 85.1284
HEIDKE SKILL SCORE: 0.51818
CHI SCORE: 2.66
THREAT SCORE: 0.39393

CASES = 359000

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	0	0	0	0	0	0	0
200 - 400	0	0	0	0	0	0	0
500 - 900	2	10	223	18	52	372	677
GEM 1000 - 2900	7	46	71	465	508	2086	3183
3000 - 6000	0	200	569	505	5652	12314	19240
CLR BELOW 6001	47	397	1558	1863	9432	322603	335900
COLUMN TOTALS:	56	653	2421	2851	15644	337375	359000
BIASES:	0.00	0.00	0.28	1.12	1.23	1.00	

PERCENT CORRECT: 91.6276

HEIDKE SKILL SCORE: 0.29220

CHI SCORE: 2837.02

THREAT SCORE: 0.00000

CASES = 359000

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	0	0	1	6	0	47	54
200 - 400	1	20	15	45	107	483	671
500 - 900	2	14	365	66	473	1506	2426
PERSISTENCE 1000 - 2900	9	48	162	365	423	1852	2859
3000 - 6000	1	125	459	475	4647	9885	15592
CLR BELOW 6001	43	446	1419	1894	9994	323602	337398
COLUMN TOTALS:	56	653	2421	2851	15644	337375	359000
BIASES:	0.96	1.03	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 91.6432

HEIDKE SKILL SCORE: 0.27193

CHI SCORE: 0.77

THREAT SCORE: 0.01486

CASES = 359000

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	210285	17458	973	484	229200
	SCT	17476	45370	9715	6693	79254
GEM	BKN	255	3796	3072	3688	10811
	OVC	452	5799	6036	27448	39735
	COLUMN TOTALS:	228468	72423	19796	38313	359000
	BIASES:	1.00	1.09	0.55	1.04	

PERCENT CORRECT: 79.7145
HEIDKE SKILL SCORE: 0.62132
CHI SCORE: 4777.54

CASES = 359000

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	209566	17333	944	447	228290
	SCT	17425	41987	7850	5327	72589
PERSISTENCE	BKN	1025	7726	5403	5732	19886
	OVC	452	5377	5599	26807	38235
	COLUMN TOTALS:	228468	72423	19796	38313	359000
	BIASES:	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 79.0426
HEIDKE SKILL SCORE: 0.61197
CHI SCORE: 1.09

CASES = 359000

CLOUD COVER TWO

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS	
GEM	CLR BELOW 6001	273988	12313	5849	5379	297529
	SCT	13425	10359	5214	2027	31025
	BKN	3596	3277	4684	2695	14252
	OVC	5991	1665	3384	5154	16194
	COLUMN TOTALS:	297000	27614	19131	15255	359000
	BIASES:	1.00	1.12	0.74	1.06	

PERCENT CORRECT: 81.9457
HEIDKE SKILL SCORE: 0.40548
CHI SCORE: 1724.38

CASES = 359000

CLOUD COVER TWO

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS	
PERSISTENCE	CLR BELOW 6001	273451	12241	5825	5371	296888
	SCT	12301	9257	4372	1847	27777
	BKN	5531	4598	5843	3156	19128
	OVC	5717	1518	3091	4881	15207
	COLUMN TOTALS:	297000	27614	19131	15255	359000
	BIASES:	1.00	1.01	1.00	1.00	

PERCENT CORRECT: 81.7359
HEIDKE SKILL SCORE: 0.40166
CHI SCORE: 1.16

CASES = 359000

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW	6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	321105	5227	5579	4853	336764
GEM	SCT	1928	613	528	266	3335
	BKN	5558	1167	1791	1221	9737
	OVC	4703	424	1204	2833	9164
	COLUMN TOTALS:	333294	7431	9102	9173	359000
	BIASES:	1.01	0.45	1.07	1.00	

PERCENT CORRECT: 90.9031
HEIDKE SKILL SCORE: 0.28694
CHI SCORE: 283.17

CASES = 35

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW	6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	318705	4744	5177	4729	333355
PERSISTENCE	SCT	4750	1214	1038	434	7436
	BKN	5153	1053	1684	1179	9069
	OVC	4686	420	1203	2831	9140
	COLUMN TOTALS:	333294	7431	9102	9173	359000
	BIASES:	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 90.3716
HEIDKE SKILL SCORE: 0.29309
CHI SCORE: 0.25

CASES = 359000

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
GEM	0 < 1/2	699	250	253	111	32	1353
	1/2 < 1	242	847	570	143	15	1841
	1 < 3	185	697	9747	4046	601	15760
	3 < 5	76	196	5205	19661	6104	33588
	5 < 7	22	57	821	7523	18444	34622
	7 +	16	46	543	1882	8747	271836
COLUMN TOTALS:		1240	2093	17139	33366	33943	271219
BIASES:		1.09	0.88	0.92	1.01	1.02	1.00

PERCENT CORRECT: 86.3510
 HEIDKE SKILL SCORE: 0.66546
 CHI SCORE: 168.06
 THREAT SCORE: 0.45400

CASES = 359000

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
PERSISTENCE	0 < 1/2	699	250	272	114	32	1375
	1/2 < 1	259	898	707	224	32	2157
	1 < 3	176	677	10122	4821	825	17217
	3 < 5	76	178	4803	19480	6310	33429
	5 < 7	16	47	703	6964	18188	34009
	7 +	14	43	532	1763	8556	270813
COLUMN TOTALS:		1240	2093	17139	33366	33943	271219
BIASES:		1.11	1.03	1.00	1.00	1.00	1.00

PERCENT CORRECT: 86.1538
 HEIDKE SKILL SCORE: 0.66241
 CHI SCORE: 17.86
 THREAT SCORE: 0.44253

CASES = 359000

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS
0 - 10	310204	14137	2257	50	9	326657
11 - 20	9485	8521	2715	32	0	20753
21 - 30	2106	2923	5483	786	15	11313
31 - 40	29	25	138	82	3	277
41 +	0	0	0	0	0	0
COLUMN TOTALS:	321824	25606	10593	950	27	359000
BIASES:	1.02	0.81	1.07	0.23	0.00	

PERCENT CORRECT: 90.3315
HEIDKE SKILL SCORE: 0.46065
CHI SCORE: 1545.05

CASES = 359000

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS
0 - 10	307220	12673	2206	54	9	322162
11 - 20	12471	9989	2794	34	0	25288
21 - 30	2083	2905	5111	516	0	10615
31 - 40	42	39	480	329	18	908
41 +	8	0	2	17	0	27
COLUMN TOTALS:	321824	25606	10593	950	27	359000
BIASES:	1.00	0.99	1.00	0.96	1.00	

PERCENT CORRECT: 89.8744
HEIDKE SKILL SCORE: 0.46605
CHI SCORE: 6.21

CASES = 359000

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	344	307	62	46	0	316	1075
200 - 400	421	7260	1413	427	73	519	10113
500 - 900	33	1341	6272	1320	129	735	9830
GEM 1000 - 2900	9	430	1568	15633	2038	2834	22512
3000 - 6000	4	6	67	1850	31749	9672	43348
CLR BELOW 6001	203	457	474	2496	8745	259747	272122
COLUMN TOTALS:	1014	9801	9856	21772	42734	273823	359000
BIASES:	1.06	1.03	1.00	1.03	1.01	0.99	

PERCENT CORRECT: 89.4164
HEIDKE SKILL SCORE: 0.73682
CHI SCORE: 58.21
THREAT SCORE: 0.60947

CASES = 359000

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	350	390	74	37	0	223	1074
200 - 400	366	7044	1526	402	69	460	9867
500 - 900	50	1344	5896	1498	102	852	9742
PERSISTENCE 1000 - 2900	5	476	1808	14714	1907	2809	21719
3000 - 6000	12	11	115	2273	30640	9606	42657
CLR BELOW 6001	231	536	437	2848	10016	259873	273941
COLUMN TOTALS:	1014	9801	9856	21772	42734	273823	359000
BIASES:	1.06	1.01	0.99	1.00	1.00	1.00	

PERCENT CORRECT: 88.7234
HEIDKE SKILL SCORE: 0.71714
CHI SCORE: 5.63
THREAT SCORE: 0.59900

CASES = 359000

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
CLR BELOW 6001	210260	15663	2193	1100	229216
SCT	15690	20630	7530	5233	49083
BKN	1453	4529	5019	6201	17202
OVC	1065	4533	7694	50207	63499
COLUMN TOTALS:	228468	45355	22436	62741	359000
BIASES:	1.00	1.08	0.77	1.01	

PERCENT CORRECT: 79.6981
HEIDKE SKILL SCORE: 0.62576
CHI SCORE: 1539.05

CASES = 359000

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
CLR BELOW 6001	209566	15520	2165	1039	228290
SCT	15621	19166	6404	4460	45651
BKN	2225	6342	6435	7475	22477
OVC	1056	4327	7432	49767	62582
COLUMN TOTALS:	228468	45355	22436	62741	359000
BIASES:	1.00	1.01	1.00	1.00	

PERCENT CORRECT: 79.3688
HEIDKE SKILL SCORE: 0.62135
CHI SCORE: 2.55

CASES = 359000

GEM VS. PERSISTENCE 50 MINUTE PROJECTION

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTALS
0 - 29.235	0	31	0	0	0	0	0	0	0	31
29.236 - 29.530	30	3627	280	0	0	0	0	0	0	3937
29.531 - 29.677	0	232	12221	944	0	0	0	0	0	13397
29.678 - 29.825	0	0	991	38298	3377	0	0	0	0	42666
29.826 - 29.973	0	0	0	3426	83540	3586	0	0	0	90551
29.974 - 30.120	0	0	0	0	3713	68426	3281	0	0	95420
30.121 - 30.268	0	0	0	0	0	3414	73948	1905	0	79267
30.269 - 30.563	0	0	0	0	0	0	1854	35270	143	37267
30.564 +	0	0	0	0	0	0	0	112	1956	2068
COLUMN TOTALS:	30	3890	13492	42668	90630	95426	79083	37287	2099	364605
BIASES:	1.03	1.01	0.99	1.00	1.00	1.00	1.00	1.00	0.99	

PERCENT CORRECT: 92.5072
 HEDYS SKILL SCORE: 0.90598
 JHI SCORE: 2.23

364605

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTALS
0 - 29.235	0	31	0	0	0	0	0	0	0	31
29.236 - 29.530	30	3627	280	0	0	0	0	0	0	3937
29.531 - 29.677	0	232	12221	944	0	0	0	0	0	13397
29.678 - 29.825	0	0	991	38298	3377	0	0	0	0	42666
29.826 - 29.973	0	0	0	3426	83540	3586	0	0	0	90552
29.974 - 30.120	0	0	0	0	3713	68426	3281	0	0	95420
30.121 - 30.268	0	0	0	0	0	3414	73948	1905	0	79267
30.269 - 30.563	0	0	0	0	0	0	1854	35270	143	37267
30.564 +	0	0	0	0	0	0	0	112	1956	2068
COLUMN TOTALS:	30	3890	13492	42668	90630	95426	79083	37287	2099	364605
BIASES:	1.03	1.01	0.99	1.00	1.00	1.00	1.00	1.00	0.99	

PERCENT CORRECT: 92.5072
 HEDYS SKILL SCORE: 0.90598
 JHI SCORE: 2.23

364605

P-001

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
JEM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 14	0	547	42	11	0	0	0	0	0	0	0	0	0	0	600
15 - 24	0	204	6931	2584	41	4	0	0	0	0	0	0	0	0	9764
25 - 34	0	0	2155	38160	5719	835	86	1	0	0	0	0	0	0	46956
35 - 39	0	0	0	6131	23869	6164	745	116	3	0	0	0	0	0	37028
40 - 44	0	0	0	251	7123	20398	5308	769	97	6	0	0	0	0	33952
45 - 49	0	0	0	20	403	5946	15830	4973	697	82	4	0	0	0	27955
50 - 54	0	0	0	0	39	537	5040	16648	4845	637	49	0	0	0	28395
55 - 59	0	0	0	0	5	24	480	5339	14474	4349	669	0	0	0	25320
60 - 64	0	0	0	0	0	4	70	542	4564	15661	6388	7	0	0	27236
65 - 74	0	0	0	0	0	0	0	18	429	6225	55492	6568	1	0	68733
75 - 84	0	0	0	0	0	0	0	0	1	17	5747	29733	3567	0	39065
85 - 94	0	0	0	0	0	0	0	0	0	0	50	3224	14484	485	18243
95 +	0	0	0	0	0	0	0	0	0	0	0	10	465	883	1358
COLUMN TOTALS:	0	751	9128	47157	37199	33912	28139	28406	25110	26977	68399	39542	18517	1368	364605
BIASES:	99.99	0.80	1.07	1.00	1.00	1.00	0.99	1.00	1.01	1.01	1.00	0.99	0.99	0.99	

PERCENT CORRECT: 69.4203
HEIDKE SKILL SCORE: 0.65711
CHI SCORE: 93.35

CASES = 364605

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	< 5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
5 - 14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 - 24	0	547	42	11	0	0	0	0	0	0	0	0	0	0	600
25 - 34	0	204	6931	2584	41	4	0	0	0	0	0	0	0	0	9764
35 - 39	0	0	2155	38160	5719	835	86	1	0	0	0	0	0	0	46956
40 - 44	0	0	0	6131	23869	6164	745	116	3	0	0	0	0	0	37028
45 - 49	0	0	0	251	7123	20398	5308	769	97	6	0	0	0	0	33952
50 - 54	0	0	0	20	403	5946	15830	4973	697	82	4	0	0	0	27955
55 - 59	0	0	0	0	39	537	5640	16648	4845	637	49	0	0	0	28395
60 - 64	0	0	0	0	5	24	460	5339	14474	4349	669	0	0	0	25320
65 - 74	0	0	0	0	0	4	73	542	4564	15661	6388	7	0	0	27236
75 - 84	0	0	0	0	0	0	0	18	429	6225	55492	6568	1	0	68733
85 - 94	0	0	0	0	0	0	0	0	1	17	5747	29733	3567	0	39065
95 +	0	0	0	0	0	0	0	0	0	0	50	3224	14484	485	18243
												10	465	883	1358
COLUMN TOTALS:	0	751	9128	47157	37199	33912	28139	28406	25110	26977	68399	39542	18517	1368	364605
BIASES:	99.99	0.80	1.07	1.00	1.00	1.00	0.99	1.00	1.01	1.01	1.00	0.99	0.99	0.99	

PERCENT CORRECT: 69.4203
 HEINE SKILL SCORE: 0.65711
 CHI SCORE: 93.33

CASES = 364605

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS
GEM						
0 - 1	8822	15381	692	8	0	24903
2 - 7	12343	105691	15700	176	3	133913
8 - 15	300	15533	100177	12353	29	128392
16 - 25	4	185	11206	48170	3686	63251
26 +	0	0	32	3116	10998	14146
COLUMN TOTALS:	21469	136790	127807	63823	14716	364605
BIASES:	1.16	0.98	1.00	0.99	0.96	

PERCENT CORRECT: 75.1109
 HEIDKE SKILL SCORE: 0.64586
 CHI SCORE: 639.67

CASES = 364605

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS
PERSISTENCE						
0 - 1	8316	12777	653	11	0	21757
2 - 7	12849	108295	15739	173	3	137059
8 - 15	300	15533	100177	12353	29	128392
16 - 25	4	185	11206	48170	3686	63251
26 +	0	0	32	3116	10998	14146
COLUMN TOTALS:	21469	136790	127807	63823	14716	364605
BIASES:	1.01	1.00	1.00	0.99	0.96	

PERCENT CORRECT: 75.6863
 HEIDKE SKILL SCORE: 0.65170
 CHI SCORE: 641.27

CASES = 364605

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
0 - 1	4050	9560	61	0	0	13671
2 - 9	11818	269236	17397	50	0	298501
SEM 10 - 19	1	17115	32133	1322	0	51571
20 - 29	0	31	408	419	4	862
30 +	0	0	0	0	0	0
COLUMN TOTALS:	15869	295942	50999	1791	4	364605
BIASES:	0.86	1.01	1.01	0.48	0.00	

PERCENT CORRECT: 84.1563

HEIDKE SPILL SCORE: 0.49551

WIND SPEED

30-40

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
0 - 1	4380	11559	70	0	0	16009
2 - 9	11488	267199	17494	52	0	296233
PERSISTENCE 10 - 19	1	17140	32388	1077	0	50606
20 - 29	0	44	1047	658	4	1753
30 +	0	0	0	4	0	4
COLUMN TOTALS:	15869	295942	50999	1791	4	364605
BIASES:	1.01	1.00	0.99	0.98	1.00	

PERCENT CORRECT: 84.1563

HEIDKE SPILL SCORE: 0.48460

WIND SPEED

30-40

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
GEN	0 - 44	25162	7091	1522	770	658	428	2175	50250
	45 - 89	6756	10339	3270	782	506	349	1749	26675
	90 - 134	1205	2592	7619	3090	1402	531	1476	19492
	135 - 179	556	752	2417	9258	6957	1142	2365	25044
	180 - 224	617	502	958	5896	38391	9617	3965	61784
	225 - 269	509	380	616	1426	8346	11297	5268	29556
	270 - 314	2162	1641	1465	2198	3421	4882	26356	56339
	315 - 359	13488	3275	1592	1734	1784	1432	12156	95465
COLUMN TOTALS:		50455	26572	19459	25154	61465	29678	55510	96312
BIASES:		1.00	1.00	1.00	1.00	1.01	1.00	1.01	0.99

PERCENT CORRECT: 51.6795

HEIDKE SKILL SCORE: 0.42486

CHI SCORE: 23.76

CASES = 364605

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
PERSISTENCE	0 - 44	25162	7091	1522	770	658	428	2175	50250
	45 - 89	6756	10339	3270	782	506	349	1749	26675
	90 - 134	1205	2592	7619	3090	1402	531	1476	19492
	135 - 179	556	752	2417	9258	6957	1142	2365	25044
	180 - 224	617	502	958	5896	38391	9617	3965	61784
	225 - 269	512	381	616	1426	8349	11334	5284	29625
	270 - 314	2157	1640	1465	2198	3418	4845	26324	55604
	315 - 359	13494	3275	1592	1734	1784	1432	12172	96131
COLUMN TOTALS:		50455	26572	19459	25154	61465	29678	55510	96312
BIASES:		1.00	1.00	1.00	1.00	1.01	1.00	1.00	1.00

PERCENT CORRECT: 51.8575

HEIDKE SKILL SCORE: 0.42685

CHI SCORE: 4.02

CASES = 364605

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS
0 - 100	225	350	25	65	22	243	275	1205
200 - 400	377	7726	1682	312	192	1032	556	11877
500 - 900	100	2036	7072	1237	287	711	431	11874
SEM 1000 - 2900	33	866	2649	20630	2811	2872	523	30386
3000 - 6000	30	415	295	5289	48932	14550	348	69859
CLR BELOW 6001	232	837	514	3599	14435	211686	1104	232407
X/-X	251	812	332	283	226	1153	3940	6997
COLUMN TOTALS:	1248	13044	12569	31415	66905	232247	7177	364605
BIASES:	0.97	0.91	0.94	0.97	1.04	1.00	0.97	

PERCENT CORRECT: 82.3387
 HEIDKE SKILL SCORE: 0.67828
 CHI SCORE: 313.07
 THREAT SCORE: 0.46416

CASES = 364605

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS
0 - 100	227	357	25	65	22	243	277	1216
200 - 400	384	8114	2195	555	269	1121	522	13160
500 - 900	100	2032	7033	1739	353	700	442	12399
PERSISTENCE 1000 - 2900	51	532	2220	20965	4207	3035	378	31388
3000 - 6000	0	322	172	4120	47305	14291	298	66508
CLR BELOW 6001	232	836	514	3613	14480	211663	1094	232432
X/-X	254	851	410	358	269	1194	4166	7502
COLUMN TOTALS:	1248	13044	12569	31415	66905	232247	7177	364605
BIASES:	0.97	1.01	0.99	1.00	0.99	1.00	1.05	

PERCENT CORRECT: 82.1363
 HEIDKE SKILL SCORE: 0.67530
 CHI SCORE: 21.39
 THREAT SCORE: 0.46370

CASES = 364605

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS	
	0 - 100	412	164	105	79	2	483	1245
	200 - 400	219	775	203	153	48	518	1916
	500 - 900	54	142	1191	994	126	1605	4112
GEM	1000 - 2900	95	195	956	5908	1756	4937	13847
	3000 - 6000	0	24	79	1655	27929	28645	58332
	CLR BELOW 6001	392	569	1770	5022	14193	263207	285153
	COLUMN TOTALS:	1172	1869	4304	13811	44054	299395	364605
	BIASES:	1.06	1.03	0.96	1.00	1.32	0.95	

PERCENT CORRECT: 82.1223
HEIDKE SKILL SCORE: 0.46927
CHI SCORE: 5319.40
THREAT SCORE: 0.33895

CASES = 364605

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS	
	0 - 100	412	164	105	79	2	483	1245
	200 - 400	219	775	201	143	43	519	1900
	500 - 900	54	142	1234	1045	126	1706	4307
PERSISTENCE	1000 - 2900	95	195	929	5866	1772	4919	13776
	3000 - 6000	0	22	94	1658	24102	17931	43807
	CLR BELOW 6001	392	571	1741	5020	18009	273837	299570
	COLUMN TOTALS:	1172	1869	4304	13811	44054	299395	364605
	BIASES:	1.06	1.02	1.00	1.00	0.99	1.00	

PERCENT CORRECT: 83.9884
HEIDKE SKILL SCORE: 0.48215
CHI SCORE: 6.64
THREAT SCORE: 0.34012

CASES = 364605

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	0	0	0	0	0	0	0
200 - 400	0	0	0	0	0	0	0
500 - 900	2	8	199	36	69	492	806
1000 - 2900	2	46	76	434	530	2027	3115
3000 - 6000	0	178	532	400	5269	12979	19358
CLR BELOW 6001	52	429	1646	2032	10029	327138	341326
COLUMN TOTALS:	56	661	2453	2902	15897	342636	364605
BIASES:	0.00	0.00	0.33	1.07	1.22	1.00	

PERCENT CORRECT: 91.3427
 HEIDKE SKILL SCORE: 0.26544
 CHI SCORE: 2596.98
 THREAT SCORE: 0.00000

CASES = 364605

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	0	0	3	9	1	45	58
200 - 400	0	18	11	56	113	475	673
500 - 900	2	29	307	62	468	1595	2463
1000 - 2900	4	48	143	349	420	1925	2889
3000 - 6000	0	96	455	405	430	10594	15870
CLR BELOW 6001	50	470	1534	2021	10575	329002	342652
COLUMN TOTALS:	56	661	2453	2902	15897	342636	364605
BIASES:	1.04	1.02	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 91.3306
 HEIDKE SKILL SCORE: 0.24501
 CHI SCORE: 0.43
 THREAT SCORE: 0.01259

CASES = 364605

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
CLR BELOW 6001	211600	19444	1250	793	233087
SCT	18983	44890	10252	8343	82468
BKN	271	2943	2331	2948	8493
OVC	868	6503	6306	26880	40557
COLUMN TOTALS:	231722	73780	20139	38964	364605
BIASES:	1.01	1.12	0.42	1.04	

PERCENT CORRECT: 78.3590
HEIDKE SKILL SCORE: 0.59532
CHI SCORE: 7830.89

CASES = 364605

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
CLR BELOW 6001	210626	19052	1231	747	231656
-SCT	18911	40761	8013	6119	73804
BKN	1345	7870	5065	5978	20258
OVC	840	6097	5830	26120	38887
COLUMN TOTALS:	231722	73780	20139	38964	364605
BIASES:	1.00	1.00	1.01	1.00	

PERCENT CORRECT: 77.5009
HEIDKE SKILL SCORE: 0.58394
CHI SCORE: 0.86

CASES = 364605

CLOUD COVER TWO

VERIFYING OBSERVATION

		CLR BELOW				ROW TOTALS
		6001	SCT	BKN	OVC	
GEM	CLR BELOW 6001	276045	13175	6594	5819	301633
	SCT	14052	9758	4907	2189	30906
	BKN	4517	3214	4523	2678	14932
	OVC	6843	1963	3471	4857	17134
COLUMN TOTALS:		301457	28110	19495	15543	364605
BIASES:		1.00	1.10	0.77	1.10	

PERCENT CORRECT: 80.4897
 HEIDKE SKILL SCORE: 0.57627
 CHI SCORE: 1509.06

CASES = 364605

CLOUD COVER TWO

VERIFYING OBSERVATION

		CLR BELOW				ROW TOTALS
		6001	SCT	BKN	OVC	
PERSISTENCE	CLR BELOW 6001	275763	13124	6627	5916	301430
	SCT	13125	8819	4281	2025	28250
	BKN	6386	4443	5468	3111	19428
	OVC	6183	1719	3099	4489	15490
COLUMN TOTALS:		301457	28110	19495	15543	364605
BIASES:		1.00	1.00	1.00	1.00	

PERCENT CORRECT: 80.7885
 HEIDKE SKILL SCORE: 0.37178
 CHI SCORE: 1.11

CASES = 364605

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS	
GEM	CLR BELOW 6001	325135	5547	5965	5271	341918
	SCT	2671	553	566	329	4119
	BKN	5480	1046	1526	1041	9093
	OVC	5190	422	1182	2681	9475
	COLUMN TOTALS:	338476	7568	9239	9322	364605
	BIASES:	1.01	0.54	0.98	1.02	

PERCENT CORRECT: 90.4801
HEIDKE SKILL SCORE: 0.25566
CHI SCORE: 1611.65

CASES = 364605

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS	
PERSISTENCE	CLR BELOW 6001	322822	5055	5462	5188	338527
	SCT	5091	1047	1048	416	7602
	BKN	5546	1057	1547	1052	9202
	OVC	5017	409	1182	2666	9274
	COLUMN TOTALS:	338476	7568	9239	9322	364605
	BIASES:	1.00	1.00	1.00	0.99	

PERCENT CORRECT: 89.9829
HEIDKE SKILL SCORE: 0.26528
CHI SCORE: 0.56

CASES = 364605

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0	1/2	1/2 + 1	1 + 3	3 + 5	5 + 7	7 +	ROW TOTALS
GEM	0 1/2	620	270	313	153	40	9	1405
	1/2 + 1	230	799	551	200	22	16	1838
	1 + 3	200	740	9206	4407	787	666	16006
	3 + 5	89	229	5716	18927	6696	3230	34877
	5 + 7	34	62	903	8052	16978	8310	34339
	7 +	28	62	701	2127	9978	253254	276150
COLUMN TOTALS:		1201	2162	17390	33866	34501	275465	364605
BIASES:		1.17	0.85	0.92	1.03	1.00	1.00	

PERCENT CORRECT: 64.9643

HEIDKE SKILL SCORE: 0.63130

CHI SCORE: 128.94

THREAT SCORE: 0.41931

CASES = 364605

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0	1/2	1/2 + 1	1 + 3	3 + 5	5 + 7	7 +	ROW TOTALS
PERSISTENCE	0 1/2		270	318	159	40	10	1417
	1/2 + 1	248	849	701	281	49	44	2172
	1 + 3		722	9598	5168	1004	798	17479
	3 + 5	88	207	5258	18544	6543	3385	34025
	5 + 7	28	59	847	7683	17140	8818	34575
	7 +	28	55	668	2031	9725	262430	274937
COLUMN TOTALS:		1201	2162	17390	33866	34501	275485	364605
BIASES:		1.18	1.00	1.01	1.00	1.00	1.00	

PERCENT CORRECT: 64.7989

HEIDKE SKILL SCORE: 0.62949

CHI SCORE: 41.34

THREAT SCORE: 0.40120

CASES = 364605

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS	
	0 - 10	314984	14441	2501	53	9	331988
	11 - 20	9525	8561	2741	50	0	20877
GEM	21 - 30	2280	3016	5528	833	19	11676
	31 - 40	12	0	25	27	0	64
	41 +	0	0	0	0	0	0
	COLUMN TOTALS:	326801	26018	10795	963	28	364605
	BIASES:	1.02	0.80	1.08	0.07	0.00	

PERCENT CORRECT: 90.2621
HEIDKE SKILL SCORE: 0.45547
CHI SCORE: 2037.31

CASES = 364605

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS	
	0 - 10	311772	12880	2513	50	9	327224
	11 - 20	12746	10126	2739	59	0	25670
PERSISTENCE	21 - 30	2228	2952	5068	508	2	10758
	31 - 40	46	60	475	328	17	926
	41 +	9	0	0	18	0	27
	COLUMN TOTALS:	326801	26018	10795	963	28	364605
	BIASES:	1.00	0.99	1.00	0.96	0.96	

PERCENT CORRECT: 89.7667
HEIDKE SKILL SCORE: 0.46048
CHI SCORE: 5.79

CASES = 364605

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	394	339	70	48	2	356	1111
200 - 400	448	7074	1602	486	81	642	10333
500 - 900	47	1509	5928	1544	126	930	10084
SEM 1000 - 2900	11	494	1812	14990	2239	3238	22784
3000 - 6000	3	12	93	2351	31093	11385	44537
CLR BELOW 6001	207	553	525	2999	9965	261506	275757
COLUMN TOTALS:	1314	9980	10022	22118	43506	277957	364605
BIASES:	1.09	1.04	1.01	1.03	1.02	0.99	

PERCENT CORRECT: 88.0117
 HEIDKE SKILL SCORE: 0.70290
 THI SCORE: 80.95
 THREAT SCORE: 0.57174

CASES = 364605

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	394	488	90	38	0	257	1102
200 - 400	373	6990	1661	504	68	570	10656
500 - 900	72	1454	3634	1636	93	994	9884
PERFISTENCE 1000 - 2900	15	575	1973	14261	2087	3173	22084
3000 - 6000	12	16	124	2431	29929	10871	43393
CLR BELOW 6001	257	623	537	3248	11329	262092	278086
COLUMN TOTALS:	1314	9980	10022	22118	43506	277957	364605
BIASES:	1.06	1.01	0.99	1.00	1.00	1.00	

PERCENT CORRECT: 87.5262
 HEIDKE SKILL SCORE: 0.66750
 THI SCORE: 77.44
 THREAT SCORE: 0.561

CASES = 364605

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
CLR BELOW 6001	211416	17009	2669	1717	232811
SCT	16569	19522	7676	6345	50112
BKN	1937	4390	4398	5912	16637
OVC	1800	5314	8076	49855	65045
COLUMN TOTALS:	231722	46235	22819	63829	364605
BIASES:	1.00	1.08	0.73	1.02	

PERCENT CORRECT: 78.2192
HEIDKE SKILL SCORE: 0.59864
CHI SCORE: 2028.18

CASES = 364605

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
CLR BELOW 6001	210626	16759	2628	1643	231656
SCT	16620	18087	6419	5304	46430
BKN	2710	6332	6050	7776	22868
OVC	1766	5057	7722	49106	63651
COLUMN TOTALS:	231722	46235	22819	63829	364605
BIASES:	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 77.8566
HEIDKE SKILL SCORE: 0.59412
CHI SCORE: 1.44

CASES = 364605

GEM VS. PERSISTENCE 60 MINUTE PROJECTION

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.121	30.121- 30.268	30.269- 30.564	30.564 +	ROW TOTALS
0 - 29.235	0	31	0	0	0	0	0	0	0	31
29.236 - 29.530	31	3704	345	0	0	0	0	0	0	4017
29.531 - 29.677	0	276	12452	1148	0	0	0	0	0	13056
29.678 - 29.825	0	6	1193	38894	4018	0	0	0	0	44111
29.826 - 29.973	0	0	0	4079	85081	4368	0	0	0	93528
29.974 - 30.121	0	0	0	0	4526	90102	3960	0	0	98588
30.121 - 30.268	0	0	0	0	0	4118	75443	2295	0	81856
30.269 - 30.564	0	0	0	0	0	0	2230	36302	178	38410
30.564 +	0	0	0	0	0	0	0	136	1993	2129
COLUMN TOTALS:	31	4017	13990	44121	93625	98588	81633	38433	2171	376609
BIASES:	1.00	1.02	0.99	1.00	1.00	1.00	1.00	1.00	1.98	

PERCENT CORRECT: 91.2541
 REMOTE SKILL SCORE: 0.99026
 CHI SCORE: 0.46

CHI2 = 0.00009

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.121	30.121- 30.268	30.269- 30.564	30.564 +	ROW TOTALS
0 - 29.235	0	31	0	0	0	0	0	0	0	31
29.236 - 29.530	31	3704	345	0	0	0	0	0	0	4017
29.531 - 29.677	0	276	12452	1148	0	0	0	0	0	13056
29.678 - 29.825	0	6	1193	38894	4018	0	0	0	0	44111
PERSISTENCE 29.826 - 29.973	0	0	0	4079	85081	4368	0	0	0	93528
29.974 - 30.121	0	0	0	0	4526	90102	3960	0	0	98588
30.121 - 30.268	0	0	0	0	0	4118	75443	2295	0	81856
30.269 - 30.564	0	0	0	0	0	0	2230	36302	178	38410
30.564 +	0	0	0	0	0	0	0	136	1993	2129
COLUMN TOTALS:	31	4017	13990	44121	93625	98588	81633	38433	2171	376609
BIASES:	1.00	1.02	0.99	1.00	1.00	1.00	1.00	1.00	0.98	

PERCENT CORRECT: 91.2541
 REMOTE SKILL SCORE: 0.99026
 CHI SCORE: 0.46

CHI2 = 0.00009

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 14	0	522	36	20	0	0	0	0	0	0	0	0	0	0	578
15 - 24	0	236	6828	2892	110	16	0	0	0	0	0	0	0	0	10082
25 - 34	0	0	2479	38284	6294	1157	201	6	0	0	0	0	0	0	48421
35 - 39	0	0	0	7026	23523	6546	943	238	14	0	0	0	0	0	38290
40 - 44	0	0	0	383	7915	19995	5679	952	195	16	1	0	0	0	35136
45 - 49	0	0	0	20	608	6591	15315	5213	898	157	4	0	0	0	28906
50 - 54	0	0	0	0	62	695	6188	16329	5043	907	86	0	0	0	29310
55 - 59	0	0	0	0	6	34	646	5784	14289	4436	964	0	0	0	26159
60 - 64	0	0	0	0	0	10	84	769	4874	15526	6898	13	0	0	28174
65 - 74	0	0	0	0	0	0	0	25	591	6771	56176	7554	10	0	71127
75 - 84	0	0	0	0	0	0	0	0	2	25	6520	29653	4117	0	40317
85 - 94	0	0	0	0	0	0	0	0	0	0	90	3643	14560	529	18622
95 +	0	0	0	0	0	0	0	0	0	0	0	17	477	893	1367
COLUMN TOTALS:	0	756	9343	48625	38518	35044	29056	29316	25906	27838	70739	40880	19164	1422	376609
BIASES:	99.99	0.76	1.08	1.00	0.99	1.00	0.99	1.00	1.01	1.01	1.01	0.99	0.98	0.98	

PERCENT CORRECT: 66.8845
 HEIDKE SKILL SCORE: 0.52864
 CHI SCORE: 129.17

CASES = 376609

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	< 5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
< 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 14	0	522	36	20	0	0	0	0	0	0	0	0	0	0	578
15 - 24	0	236	6828	2892	110	16	0	0	0	0	0	0	0	0	10082
25 - 34	0	0	2479	38284	6294	1157	201	6	0	0	0	0	0	0	48421
35 - 39	0	0	0	7026	23523	6546	943	238	14	0	0	0	0	0	38290
40 - 44	0	0	0	383	7915	19995	5679	952	195	16	1	0	0	0	35136
45 - 49	0	0	0	20	608	6591	15315	5213	898	157	4	0	0	0	28806
50 - 54	0	0	0	0	62	695	6188	16329	5043	907	86	0	0	0	29310
55 - 59	0	0	0	0	6	34	645	5784	14289	4436	964	0	0	0	26159
60 - 64	0	0	0	0	0	10	84	769	4874	15526	6898	13	0	0	28174
65 - 74	0	0	0	0	0	0	0	25	591	6771	56176	7554	10	0	71127
75 - 84	0	0	0	0	0	0	0	0	2	25	6520	29653	4117	0	40317
85 - 94	0	0	0	0	0	0	0	0	0	0	90	3643	14560	529	18822
95 +	0	0	0	0	0	0	0	0	0	0	0	17	477	893	1387
COLUMN TOTALS:	0	758	9343	48625	38518	35044	29056	29316	25906	27838	70739	40880	19164	1422	376609
BIASES:	99.99	0.76	1.08	1.00	0.99	1.00	0.99	1.00	1.01	1.01	1.01	0.99	0.98	0.98	

PERCENT CORRECT: 66.8845
HEIDKE SKILL SCORE: 0.62864
CHI SCORE: 129.17

CASES = 376609

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS
GEM	0 - 1	9403	15067	890	11	25371
	2 - 7	12417	108526	17516	320	138780
	8 - 15	276	17508	100982	13950	132764
	16 - 25	4	234	12550	48207	65118
	26 +	0	0	67	3411	14576
COLUMN TOTALS:		22100	141335	132005	65899	15270
BIASES:		1.15	0.98	1.01	0.99	0.95

PERCENT CORRECT: 73.8740
HEIDKE SKILL SCORE: 0.62803
CHI SCORE: 575.49

CASES = 376609

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS
PERSISTENCE	0 - 1	8890	12687	901	14	22492
	2 - 7	12930	110906	17505	317	141659
	8 - 15	276	17508	100982	13950	132764
	16 - 25	4	234	12550	48207	65118
	26 +	0	0	67	3411	14576
COLUMN TOTALS:		22100	141335	132005	65899	15270
BIASES:		1.02	1.00	1.01	0.99	0.95

PERCENT CORRECT: 74.3697
HEIDKE SKILL SCORE: 0.63383
CHI SCORE: 52.86

CASES = 376609

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
GEM	0 - 1	4038	9720	66	0	13824
	2 - 9	12348	277633	18688	71	308740
	10 - 19	16	18164	33611	1340	53131
	20 - 29	0	33	432	445	914
	30 +	0	0	0	0	0
COLUMN TOTALS:						
BIASES:						
	16402	305550	52797	1856	4	376609
	0.84	1.01	1.01	0.49	0.00	

PERCENT CORRECT: 83.8342
HEIDKE SKILL SCORE: 0.48435
CHI SCORE: 922.72

CASES = 376609

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
PERSISTENCE	0 - 1	4435	12046	78	0	16559
	2 - 9	11951	275208	18786	74	306019
	10 - 19	16	18236	32886	1077	52215
	20 - 29	0	60	1047	701	1814
	30 +	0	0	0	4	4
COLUMN TOTALS:						
BIASES:						
	16402	305550	52797	1856	4	376609
	1.01	1.00	0.99	0.98	1.00	

PERCENT CORRECT: 83.1711
HEIDKE SKILL SCORE: 0.47307
CHI SCORE: 9.68

CASES = 376609

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
	0 - 44	25065	7310	1757	890	756	436	2396	51829
	45 - 89	6980	10304	3303	965	609	363	1985	27826
	90 - 134	1385	2733	7449	3212	1465	634	1599	20159
GEM	135 - 179	650	726	2457	9030	7234	1315	2635	25839
	180 - 224	720	533	1134	6029	38761	10232	4330	63927
	225 - 269	604	407	572	1591	8745	10985	5672	30439
	270 - 314	2420	1855	1615	2405	3920	5030	25942	58436
	315 - 359	14277	3584	1807	1824	1950	1625	12834	98405
COLUMN TOTALS:	52101	27452	20094	25946	63440	30620	57393	99563	376609
BIASES:	0.99	1.00	1.00	1.00	1.01	1.00	1.02	0.99	

PERCENT CORRECT: 49.9298

HEIDKE SKILL SCORE: 0.40403

CHI SCORE: 38.99

CASES = 376609

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
	0 - 44	25065	7310	1759	890	756	436	2396	51834
	45 - 89	6980	10307	3306	965	609	363	1985	27832
	90 - 134	1385	2733	7449	3212	1465	634	1599	20159
PERSISTENCE	135 - 179	650	726	2457	9030	7234	1315	2635	25839
	180 - 224	720	533	1134	6029	38761	10232	4330	63927
	225 - 269	605	410	577	1593	8753	11049	5701	30612
	270 - 314	2410	1846	1605	2403	3912	4966	25877	57421
	315 - 359	14286	3584	1807	1824	1950	1625	12870	99286
COLUMN TOTALS:	52101	27452	20094	25946	63440	30620	57393	99563	376619
BIASES:	0.99	1.00	1.00	1.00	1.01	1.00	1.00	1.00	

PERCENT CORRECT: 50.1523

HEIDKE SKILL SCORE: 0.40661

CHI SCORE: 6.77

CASES = 376619

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	100- 400	500- 900	1000- 1900	3000- 6000	CLF BELOW 6001	X-X	ROW TOTALS
	329	294	21	19	14	217	211	1144
	387	7520	1850	397	192	1193	595	12134
	124	2479	6871	1499	350	807	503	12648
GEN	31	912	2947	10466	3218	3178	598	31082
	27	376	326	5798	49064	16184	115	71121
	232	939	603	2941	16142	216906	1181	239963
	218	981	397	321	273	1188	3887	7248
COLUMN TOTALS:	1278	13501	10120	12493	69273	239848	7401	336639
BIASES:	0.149	0.190	0.037	0.098	1.034	1.000	0.098	

PERCENT CORRECT: 0.9659

RELATIVE SKILL SCORE: 0.99356

CHI SCORE: 124.15

THREAT SCORE: 0.4571

BIASES = 0.07601

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	100- 400	500- 900	1000- 1900	3000- 6000	CLF BELOW 6001	X-X	ROW TOTALS
	341	258	36	71	34	219	306	1062
	381	7991	2430	689	342	1050	572	10966
	181	2864	8778	1932	417	810	312	13782
PERSISTENCE	33	816	2824	21831	4815	3377	441	33464
	14	312	190	4610	47479	15839	134	68759
	232	941	603	2941	16191	216875	1169	239976
	218	1032	467	409	311	1239	4774	7738
COLUMN TOTALS:	1278	13501	10120	12493	69273	239848	7401	336639
BIASES:	0.149	0.190	0.037	0.098	1.034	1.000	0.098	

PERCENT CORRECT: 0.9660

RELATIVE SKILL SCORE: 0.99361

CHI SCORE: 124.17

THREAT SCORE: 0.4571

BIASES = 0.07601

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	351	157	114	107	2	563	1094
200 - 400	240	712	231	161	76	1386	2026
500 - 900	51	11	1129	1061	144	1596	4052
1000 - 2900	119	197	1006	5806	1854	5312	14504
3000 - 6000	0	20	93	1775	27827	30530	60345
CLR BELOW 6001	444	673	1889	5373	15663	270459	294508
COLUMN TOTALS:	1205	1928	4462	14283	45566	309163	376609
BIASES:	1.07	1.04	0.94	1.00	1.32	0.98	

PERCENT CORRECT: 81.3263
 HEIDKE SKILL SCORE: 0.44600
 CHI SCORE: 5461.10
 THREAT SCORE: 0.29307

CASES = 376609

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	351	157	114	107	2	563	1094
200 - 400	240	703	230	155	67	570	1965
500 - 900	51	133	1180	1143	159	1733	4440
1000 - 2900	121	237	969	5752	1229	5325	14297
3000 - 6000	0	20	104	1725	27147	19674	48270
CLR BELOW 6001	442	678	1865	5401	19711	281250	309347
COLUMN TOTALS:	1205	1928	4462	14283	45566	309163	376609
BIASES:	1.07	1.00	1.00	1.00	0.99	1.00	

PERCENT CORRECT: 83.1058
 HEIDKE SKILL SCORE: 0.45420
 CHI SCORE: 9.40
 THREAT SCORE: 0.29367

CASES = 376609

CLOUD HEIGHT THREE (FEET)

VERIFIED OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 5900	CLR BELOW 6001	ROW TOTALS
0 - 100	0	0	0	0	0	0	0
200 - 400	0	0	0	0	0	0	0
500 - 900	0	0	0	11	17	90	118
1000 - 2900	1	10	102	474	454	1812	2901
3000 - 5900	0	159	314	339	3054	13382	19408
CLR BELOW 6001	55	400	1507	1181	10930	336950	354087
COLUMN TOTAL	59	569	2143	1764	16455	353840	376090
BIASES:	0.00	0.00	0.00	0.00	1.18	1.00	

PERCENT CORRECT: 40.16%

REYNOLDS SKILL SCORE: 0.04011

CHI SCORE: 0.04011

THREAT SCORE: 0.04011

CASES = 10000

CLOUD HEIGHT THREE (FEET)

VERIFIED OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 5900	CLR BELOW 6001	ROW TOTALS
0 - 100	1	0	1	9	2	45	58
200 - 400	0	0	19	44	113	519	704
500 - 900	0	20	137	66	477	1701	2383
1000 - 2900	4	42	141	371	429	2002	2989
3000 - 5900	0	109	411	398	4280	11207	16405
CLR BELOW 6001	51	470	1992	2136	11154	338366	353875
COLUMN TOTALS:	56	621	2343	3024	16455	353840	376099
BIASES:	0.98	1.00	1.00	0.99	1.00	1.00	

PERCENT CORRECT: 91.1590

REYNOLDS SKILL SCORE: 0.03225

CHI SCORE: 0.03225

THREAT SCORE: 0.03225

CASES = 10000

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	217079	21415	1559	1098	241151
	SCT	20564	45522	11309	10297	87692
GEM	BKN	179	2283	1643	2227	6332
	OVC	1219	7189	6334	26693	41434
	COLUMN TOTALS:	239040	76409	20845	40315	376609
	BIASES:	1.01	1.15	0.30	1.03	

PERCENT CORRECT: 77.2517
HEIDKE SKILL SCORE: 0.57371
CHI SCORE: 11820.26

CASES = 376609

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	215760	20809	1537	1049	239155
	SCT	20393	40785	8234	6883	76295
PERSISTENCE	BKN	1698	7930	5074	6247	20949
	OVC	1189	6885	6000	26136	40210
	COLUMN TOTALS:	239040	76409	20845	40315	376609
	BIASES:	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 75.4068
HEIDKE SKILL SCORE: 0.56416
CHI SCORE: 1.00

CASES = 376609

CLOUD COVER TWO

VERIFYING OBSERVATION

		CLR BELOW				ROW TOTALS
		6001	SC1	BKN	OVC	
DEM	CLR BELOW 6001	282686	14066	7197	6367	310366
	SC1	15758	9647	5340	2460	33205
	BKN	4295	2976	3671	2066	13008
	OVC	9508	2452	3930	5228	20118
COLUMN TOTALS:		311049	29141	20138	16081	376609
BIASED:		1.00	1.14	0.65	1.25	

PERCENT CORRECT 79.9859
 HENSE SKILL COEFF 0.75758
 CHI SQUARE 4197.66

CASEC 4 10000

CLOUD COVER TWO

VERIFYING OBSERVATION

		CLR BELOW				ROW TOTALS
		6001	SC1	BKN	OVC	
PERSISTENCE	CLR BELOW 6	282694	14066	7197	6364	311321
	SC1	14297	9657	4362	2100	29189
	BKN	7127	4593	3346	3075	20151
	OVC	4490	2911	2455	4497	15991
COLUMN TOTALS:		311321	29141	20138	16081	376609
BIASED:		1.00	1.14	0.65	1.25	

PERCENT CORRECT 79.9859
 HENSE SKILL COEFF 0.75758
 CHI SQUARE 4197.66

CASEC 4 10000

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	335392	5857	6236	5643	353128
GEM	SCT	2675	438	560	279	3952
	BKN	5888	1077	1498	1134	9597
	OVC	5596	478	1279	2579	9932
	COLUMN TOTALS:	349551	7850	9573	9635	376609
	BIASES:	1.01	0.50	1.00	1.03	

PERCENT CORRECT: 90.2546

HEIDKE SKILL SCORE: 0.23968

CHI SCORE: 1981.41

CASES = 376609

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	332872	5404	5743	5611	349630
PERSISTENCE	SCT	5470	871	1065	465	7811
	BKN	5844	1104	1503	1102	9553
	OVC	5365	471	1262	2517	9615
	COLUMN TOTALS:	349551	7850	9573	9635	376609
	BIASES:	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 89.6850

HEIDKE SKILL SCORE: 0.24493

CHI SCORE: 0.29

CASES = 376609

VISIBILITY (MILES)

VERIFYING OBSERVATION

		0 + 1	1 + 2	2 + 3	3 + 4	4 + 5	5 + 6	6 + 7	7 +	ROW TOTALS
SEM	0 + 1	554	374	292	181	72	11			1384
	1 + 2	359	801	608	339	46	55			2013
	2 + 3	315	756	883	4724	984	831			16352
	3 + 4	106	246	6329	18516	6953	4033			36185
	4 + 5	42	68	1125	8630	16615	9145			35625
	5 + 6	40	77	792	2654	11015	27047			385048
COLUMN TOTALS:		1018	2001	17968	34945	35685	284570			376609
BIASES:		1.14	0.91	0.91	1.04	1.00	1.00			

PERCENT CORRECT: 83.8480
 HEIDKE SHILL SCORE: 0.60421
 CHI-SQUARE: 131.15
 FREEST SCORE: 0.000000

BIASES = 0.76614

VISIBILITY (MILES)

VERIFYING OBSERVATION

		0 + 1	1 + 2	2 + 3	3 + 4	4 + 5	5 + 6	6 + 7	7 +	ROW TOTALS
PERSISTENCE	0 + 1	554	374	292	181	72	11			1384
	1 + 2	359	801	608	339	46	55			2013
	2 + 3	314	736	9297	5519	1225	1057			18039
	3 + 4	111	239	5894	16037	6826	4100			35007
	4 + 5	41	59	1007	8305	16761	9596			35769
	5 + 6	27	65	760	2583	10733	269715			283879
COLUMN TOTALS:		1011	2001	17968	34945	35685	284570			376609
BIASES:		1.01	1.01	1.00	1.01	1.00	1.00			

PERCENT CORRECT: 80.1992
 HEIDKE SHILL SCORE: 0.00000
 CHI-SQUARE: 0.00000
 FREEST SCORE: 0.00000

BIASES = 0.76614

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS	
GEM	0 - 10	324710	15186	2576	69	9	342550
	11 - 20	10242	8696	2943	70	0	21951
	21 - 30	2515	3041	5659	838	18	12071
	31 - 40	9	0	6	22	0	37
	41 +	0	0	0	0	0	0
	COLUMN TOTALS:	337476	26923	11184	999	27	376609
	BIASES:	1.02	0.82	1.08	0.04	0.00	

PERCENT CORRECT: 90.0369

HEIDKE SKILL SCORE: 0.44597

CHI SCORE: 2018.21

CASES = 376609

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS	
PERSISTENCE	0 - 10	321506	13783	2622	72	9	337992
	11 - 20	13448	10092	2923	73	0	26536
	21 - 30	2465	3023	5105	500	0	11093
	31 - 40	48	25	534	335	18	960
	41 +	9	0	0	19	0	28
	COLUMN TOTALS:	337476	26923	11184	999	27	376609
	BIASES:	1.00	0.99	0.99	0.96	1.04	

PERCENT CORRECT: 89.4928

HEIDKE SKILL SCORE: 0.44662

CHI SCORE: 8.65

CASES = 376609

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	284	364	70	51	1	347	1117
200 - 400	444	6988	1753	563	85	753	10586
500 - 900	69	1741	5728	1696	135	1120	10489
GEM 1000 - 2900	15	573	2085	14876	2431	3679	23659
3000 - 6000	11	25	103	2162	30942	12553	46796
CLR BELOW 6001	224	633	632	3540	11417	268516	264962
COLUMN TOTALS:	1047	10324	10371	22888	45011	286968	376609
BIASES:	1.07	1.03	1.01	1.03	1.02	0.99	

PERCENT CORRECT: 86.9161
HEIDKE SKILL SCORE: 0.67578
CHI SCORE: 66.36
THREAT SCORE: 0.52886

CASES = 376609

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	258	436	109	39	0	301	1143
200 - 400	365	6818	1611	608	83	676	10391
500 - 900	98	1654	5478	1773	96	1124	10223
PERSISTENCE 1000 - 2900	27	642	2144	14293	2214	3557	22877
3000 - 6000	12	45	142	2527	29966	13293	44895
CLR BELOW 6001	287	729	657	3648	12652	269187	287080
COLUMN TOTALS:	1047	10324	10371	22888	45011	286968	376609
BIASES:	1.09	1.01	0.99	1.00	1.00	1.00	

PERCENT CORRECT: 86.5407
HEIDKE SKILL SCORE: 0.66327
CHI SCORE: 11.40
THREAT SCORE: 0.52415

CASES = 376609

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	217040	18779	3228	2332	241379
	SCT	17481	18955	8110	7613	52159
GEM	BKN	2044	4107	3739	5674	15564
	OVC	2475	6087	8533	50412	67507
	COLUMN TOTALS:	239040	47928	23610	66031	376609
	BIASES:	1.01	1.09	0.66	1.02	

PERCENT CORRECT: 77.0417
HEIDKE SKILL SCORE: 0.57606
CHI SCORE: 3171.36

CASES = 376609

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	215760	18067	3090	2238	239155
	SCT	17642	17638	6586	6059	47925
PERSISTENCE	BKN	3231	6510	5767	8215	23713
	OVC	2417	5713	8167	49519	65816
	COLUMN TOTALS:	239040	47928	23610	66031	376609
	BIASES:	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 76.6535
HEIDKE SKILL SCORE: 0.57281
CHI SCORE: 1.20

CASES = 376609

GEM VS. PERSISTENCE 70 MINUTE PROJECTION

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTAL
0 - 29.235	0	31	0	0	0	0	0	0	0	31
29.236 - 29.530	30	3514	387	0	0	0	0	0	0	3931
29.531 - 29.677	0	310	11805	1276	0	0	0	0	0	13491
29.678 - 29.825	0	15	1309	36787	4359	0	0	0	0	42470
29.826 - 29.973	0	0	0	4447	80668	4814	0	0	0	89939
29.974 - 30.120	0	0	0	0	4983	85617	4375	0	0	94975
30.121 - 30.268	0	0	0	0	0	4532	71753	2317	0	78602
30.269 - 30.563	0	0	0	0	0	0	2435	34279	201	36915
30.564 +	0	0	0	0	0	0	0	150	1861	2011
COLUMN TOTALS:	60	3870	13501	42510	90010	94963	78563	36946	2161	164474
BIASES:	1.00	1.02	0.99	1.00	1.00	1.00	1.00	1.00	0.96	

PERCENT CORRECT: 91.0211
 REMOTE S-SIDE SCORE: 0.97479
 C-SIDE SCORE: 0.91

0.910211

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTAL
0 - 29.235	0	31	0	0	0	0	0	0	0	31
29.236 - 29.530	30	3514	387	0	0	0	0	0	0	3941
29.531 - 29.677	0	310	11805	1276	0	0	0	0	0	13491
29.678 - 29.825	0	15	1309	36787	4359	0	0	0	0	42470
29.826 - 29.973	0	0	0	4447	80668	4814	0	0	0	89939
29.974 - 30.120	0	0	0	0	4983	85617	4375	0	0	94975
30.121 - 30.268	0	0	0	0	0	4532	71753	2317	0	78602
30.269 - 30.563	0	0	0	0	0	0	2435	34279	201	36915
30.564 +	0	0	0	0	0	0	0	150	1861	2011
COLUMN TOTALS:	60	3870	13501	42510	90010	94963	78563	36946	2161	164474
BIASES:	1	1.02	0.99	1.00	1.00	1.00	1.00	1.00	0.96	

0.910211
 0.97479

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 14	0	483	30	24	1	0	0	0	0	0	0	0	0	0	538
15 - 24	0	240	6322	2902	174	37	1	0	0	0	0	0	0	0	9676
25 - 34	0	2	2576	35935	6308	1357	335	41	0	0	0	0	0	0	46554
35 - 39	0	0	0	7306	21775	6402	1009	348	45	1	0	0	0	0	36887
40 - 44	0	0	0	520	7987	18387	5561	1026	274	38	0	0	0	0	33813
45 - 49	0	0	0	32	766	6653	14020	4978	1048	222	13	0	0	0	27732
50 - 54	0	0	0	0	92	841	6176	15139	4791	1078	149	0	0	0	28266
55 - 59	0	0	0	0	5	46	817	5755	13199	4247	1164	0	0	0	25235
60 - 64	0	0	0	0	0	17	98	908	4854	14470	6770	33	0	0	27150
65 - 74	0	0	0	0	0	0	0	60	734	6677	53020	7999	26	0	68516
75 - 84	0	0	0	0	0	0	0	0	2	39	6804	27508	4363	0	38716
85 - 94	0	0	0	0	0	0	0	0	0	0	129	3793	13627	528	18077
95 +	0	0	0	0	0	0	0	0	0	0	0	25	447	844	1316
COLUMN TOTALS:	0	725	6928	46719	37108	33743	28037	28355	24947	26772	68049	39358	18463	1372	362476
BIASES:	99.99	0.74	1.08	1.00	0.99	1.00	0.99	1.00	1.01	1.01	1.01	0.98	0.98	0.96	

PERCENT CORRECT: 64.7571
 HEIDKE SKILL SCORE: 0.60478
 CHI SCORE: 148.96

CASES = 362476

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
PERSISTENCE	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 14	0	483	30	24	1	0	0	0	0	0	0	0	0	0	538
15 - 24	0	240	6322	2902	174	37	1	0	0	0	0	0	0	0	9676
25 - 34	0	2	2576	35935	6308	1357	335	41	0	0	0	0	0	0	46554
35 - 39	0	0	0	7306	21775	6403	1009	348	45	1	0	0	0	0	36887
40 - 44	0	0	0	520	7987	18387	5581	1026	274	38	0	0	0	0	33813
45 - 49	0	0	0	32	766	6653	14020	4978	1048	222	13	0	0	0	27732
50 - 54	0	0	0	0	92	841	6176	15139	4791	1078	149	0	0	0	28266
55 - 59	0	0	0	0	5	48	17	5755	13199	4247	1164	0	0	0	25235
60 - 64	0	0	0	0	0	17	98	908	4854	14470	6770	33	0	0	27150
65 - 74	0	0	0	0	0	0	0	60	734	6677	53020	7999	26	0	68516
75 - 84	0	0	0	0	0	0	0	0	2	39	6804	27508	4363	0	38716
85 - 94	0	0	0	0	0	0	0	0	0	0	129	3793	13627	528	18077
95 +	0	0	0	0	0	0	0	0	0	0	0	25	447	844	1316
COLUMN TOTALS:	0	725	8928	46719	37108	33743	28037	28255	24947	26772	68049	39358	18463	1372	362476
BIASES:	99.99	0.74	1.08	1.00	0.99	1.00	0.99	1.00	1.01	1.01	1.01	0.98	0.98	0.96	

PERCENT CORRECT: 64.7571
 HEIDKE SKILL SCORE: 0.60478
 CHI SCORE: 148.96
 CASES = 362476

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS
GEM	0 - 1	9861	13219	1188	13	24281
	2 - 7	11149	104374	17899	460	133884
	8 - 15	243	18203	94800	14603	127925
	16 - 25	3	277	13062	44873	62493
	26 +	0	0	113	3475	13893
COLUMN TOTALS:		21256	136073	127062	63424	14661
BIASES:		1.14	0.98	1.01	0.99	0.95

PERCENT CORRECT: 72.8912
HEIDKE SKILL SCORE: 0.61383
CHI SCORE: 525.47

CASES = 362476

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS
PERSISTENCE	0 - 1	9470	11106	1113	13	21702
	2 - 7	11540	106487	17974	460	136463
	8 - 15	243	18203	94800	14603	127925
	16 - 25	3	277	13062	44873	62493
	26 +	0	0	113	3475	13893
COLUMN TOTALS:		21256	136073	127062	63424	14661
BIASES:		1.02	1.00	1.01	0.99	0.95

PERCENT CORRECT: 73.3662
HEIDKE SKILL SCORE: 0.61937
CHI SCORE: 70.23

CASES = 362476

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
	0 - 1	3624	9528	59	0	13411
	2 - 9	11990	266851	18791	96	297728
GEM	10 - 19	19	17574	31593	1282	50468
	20 - 29	0	24	416	417	861
	30 +	0	0	8	0	8
COLUMN TOTALS:	15833	293977	50867	1795	4	362476
BIASES:	0.85	1.01	0.99	0.48	2.00	

PERCENT CORRECT: 83.5048

HEIDKE SKILL SCORE: 0.47246

CHI SCORE: 911.48

CASES = 362476

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
	0 - 1	4193	11702	70	0	15965
	2 - 9	11617	264102	18766	97	294582
PERSISTENCE	10 - 19	23	18102	31003	1077	50205
	20 - 29	0	71	1026	619	1720
	30 +	0	0	2	2	4
COLUMN TOTALS:	15833	293977	50867	1795	4	362476
BIASES:	1.01	1.00	0.99	0.96	1.00	

PERCENT CORRECT: 82.7412

HEIDKE SKILL SCORE: 0.45982

CHI SCORE: 14.09

CASES = 362476

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
GEM	0 - 44	23526	6987	1863	916	775	443	2570	49839
	45 - 89	6639	9430	3244	1028	620	366	2025	26496
	90 - 134	1382	2694	6878	3077	1393	622	1687	19445
	135 - 179	639	748	2314	8280	7052	1316	2648	24856
	180 - 224	753	541	1164	5870	36493	10206	4260	61628
	225 - 269	666	359	530	1572	8625	9992	5589	29305
	270 - 314	2625	1893	1610	2369	4043	4859	23934	56362
	315 - 359	13837	3784	1743	1904	2022	1604	12568	94545
COLUMN TOTALS:		50067	26436	19346	25016	61023	29408	55281	362476
BIASES:		1.00	1.00	1.01	0.99	1.01	1.00	1.02	0.99

PERCENT CORRECT: 48.4490

HEIDKE SKILL SCORE: 0.38643

CHI SCORE: 49.32

CASES = 362476

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
PERSISTENCE	0 - 44	23526	6987	1864	919	775	443	2570	49843
	45 - 89	6639	9430	3247	1031	620	366	2025	26502
	90 - 134	1382	2694	6878	3077	1393	622	1687	19445
	135 - 179	639	748	2314	8280	7052	1316	2648	24856
	180 - 224	753	541	1164	5870	36493	10206	4260	61628
	225 - 269	672	362	533	1572	8646	10112	5625	29503
	270 - 314	2611	1890	1603	2363	4022	4739	23850	55210
	315 - 359	13845	3784	1743	1904	2022	1604	12616	95489
COLUMN TOTALS:		50067	26436	19346	25016	61023	29408	55281	362476
BIASES:		1.00	1.00	1.01	0.99	1.01	1.00	1.00	1.00

PERCENT CORRECT: 48.7039

HEIDKE SKILL SCORE: 0.38928

CHI SCORE: 19.85

CASES = 362476

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS
GEM								
0 - 100	212	315	44	72	40	194	308	1185
200 - 400	345	7065	2026	467	131	1096	589	11719
500 - 900	129	2262	5980	1523	374	854	545	11867
1000 - 2900	42	980	3069	19182	3577	3418	637	20905
3000 - 6000	34	389	301	5660	45131	15271	411	67197
CLR BELOW 6001	284	981	654	4069	17238	208420	1167	232813
X/-X	174	1032	462	334	289	1248	3451	6990
COLUMN TOTALS:	1220	13024	12536	31307	66780	230501	7108	362476
BIASES:	0.97	0.90	0.93	0.99	1.01	1.01	0.98	

PERCENT CORRECT: 79.8511
 HEIDKE SKILL SCORE: 0.63191
 CHI SCORE: 224.92
 THREAT SCORE: 0.41315

CASES = 362476

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS
PERSISTENCE								
0 - 100	214	324	44	75	40	196	312	1205
200 - 400	345	7410	2456	732	214	1352	583	13092
500 - 900	129	2278	6070	2004	452	839	553	12325
1000 - 2900	61	686	2578	19305	4588	3570	486	31274
3000 - 6000	13	298	182	4782	44555	15990	367	66187
CLR BELOW 6001	284	963	649	3989	16594	207265	1162	230906
X/-X	174	1065	557	420	337	1289	3645	7487
COLUMN TOTALS:	1220	13024	12536	31307	66780	230501	7108	362476
BIASES:	0.99	1.01	0.98	1.00	0.99	1.00	1.05	

PERCENT CORRECT: 79.5815
 HEIDKE SKILL SCORE: 0.62938
 CHI SCORE: 224.92
 THREAT SCORE: 0.40937

CASES = 362476

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
GEM							
0 - 100	277	144	97	117	0	615	1250
200 - 400	250	604	243	141	92	591	1921
500 - 900	38	127	918	967	127	1643	3820
1000 - 2900	122	233	1025	5385	1719	5248	13732
3000 - 6000	4	18	107	1699	25884	30065	57777
CLR BELOW 6001	449	730	1931	5432	16092	259342	283976
COLUMN TOTALS:	1140	1856	4321	13741	43914	297504	362476
BIASES:	1.10	1.04	0.88	1.00	1.32	0.95	

PERCENT CORRECT: 80.6702
HEIDKE SKILL SCORE: 0.42485
CHI SCORE: 5062.47
THREAT SCORE: 0.26063

CASES = 362476

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
PERSISTENCE							
0 - 100	277	144	97	117	0	615	1250
200 - 400	250	591	244	139	85	576	1885
500 - 900	37	141	989	1147	140	1810	4264
1000 - 2900	124	233	956	5291	1860	5334	13798
3000 - 6000	4	16	120	1625	22002	19768	43535
CLR BELOW 6001	448	731	1915	5422	19827	269401	297744
COLUMN TOTALS:	1140	1856	4321	13741	43914	297504	362476
BIASES:	1.10	1.02	0.99	1.00	0.99	1.00	

PERCENT CORRECT: 82.3643
HEIDKE SKILL SCORE: 0.43046
CHI SCORE: 15.52
THREAT SCORE: 0.25919

CASES = 362476

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	0	0	0	0	0	0	0
200 - 400	0	0	0	0	0	0	0
500 - 900	0	0	0	1	12	32	45
1000 - 2900	1	39	94	418	349	1464	2365
3000 - 6000	1	143	481	423	4759	12763	18570
CLR BELOW 6001	56	472	1874	2076	10739	326279	341496
COLUMN TOTALS:	58	654	2449	2918	15859	340538	362476
BIASES:	0.00	0.00	0.02	0.81	1.17	1.00	

PERCENT CORRECT 91.4422

HEIKKE SKILL SCORE: 0.24001

CHI SCORE: 3642.75

THREAT SCORE: 0.00000

CASES = 362476

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	0	0	0	8	2	45	55
200 - 400	2	6	30	24	118	501	681
500 - 900	0	13	231	49	393	1765	2451
1000 - 2900	1	41	136	403	361	1903	2845
3000 - 6000	5	118	367	412	4005	10931	15838
CLR BELOW 6001	50	476	1685	2022	10980	325393	340606
COLUMN TOTALS:	58	654	2449	2918	15859	340538	362476
BIASES:	0.95	1.04	1.00	0.97	1.00	1.00	

PERCENT CORRECT 91.0510

HEIKKE SKILL SCORE: 0.22006

CHI SCORE 14

THREAT SCORE 0.00000

CASES = 362476

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	207720	21758	1762	1350	232590
	SCT	20476	42303	10412	10206	83397
GEM	BKN	277	2354	1622	2367	6620
	OVC	1397	7210	6289	24973	39869
	COLUMN TOTALS:	229870	73625	20085	38896	362476
	BIASES:	1.01	1.13	0.33	1.03	

PERCENT CORRECT: 76.3135
HEIDKE SKILL SCORE: 0.55604
CHI SCORE: 10380.48

CASES = 362476

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	206147	20931	1740	1280	230098
	SCT	20426	38174	7688	7131	73419
PERSISTENCE	BKN	1914	7505	4703	6060	20182
	OVC	1383	7015	5954	24425	38777
	COLUMN TOTALS:	229870	73625	20085	38896	362476
	BIASES:	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 75.4392
HEIDKE SKILL SCORE: 0.54662
CHI SCORE: 1.64

CASES = 362476

CLOUD COVER TWO

VERIFYING OBSERVATION

	CLR BELOW	6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	272484	14799	7639	6423	301345
GEM	SCT	14688	8575	5261	2561	31085
	BKN	3441	2395	3017	1685	10538
	OVC	8844	2344	3494	4826	19508
	COLUMN TOTALS:	299457	28113	19411	15495	362476
	BIASES:	1.01	1.11	0.54	1.26	

PERCENT CORRECT: 79.7024
HEIDKE SKILL SCORE: 0.32939
CHI SCORE: 5421.36

CASES = 362476

CLOUD COVER TWO

VERIFYING OBSERVATION

	CLR BELOW	6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	271342	13971	7661	6635	299609
PERSISTENCE	SCT	14183	7828	4126	1899	28036
	BKN	7249	4434	4941	2821	19445
	OVC	6683	1880	2683	4140	15386
	COLUMN TOTALS:	299457	28113	19411	15495	362476
	BIASES:	1.00	1.00	1.00	0.99	

PERCENT CORRECT: 79.5228
HEIDKE SKILL SCORE: 0.33180
CHI SCORE: 1.11

CASES = 362476

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS	
GEM	CLR BELOW 6001	322723	5726	6079	5607	340135
	SCT	2077	312	443	212	3044
	BKN	6240	1048	1392	1206	9886
	OVC	5354	495	1316	2246	9411
	COLUMN TOTALS:	336394	7581	9230	9271	362476
	BIASES:	1.01	0.40	1.07	1.02	

PERCENT CORRECT: 90.1227
HEIDKE SKILL SCORE: 0.22604
CHI SCORE: 2805.60

CASES = 362476

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS	
PERSISTENCE	CLR BELOW 6001	319995	5262	5687	5570	336514
	SCT	5416	764	902	414	7496
	BKN	5668	1078	1356	1101	9203
	OVC	5315	477	1285	2186	9263
	COLUMN TOTALS:	336394	7581	9230	9271	362476
	BIASES:	1.00	0.99	1.00	1.00	

PERCENT CORRECT: 89.4683
HEIDKE SKILL SCORE: 0.22953
CHI SCORE: 1.08

CASES = 362476

VISIBILITY (MILES)

VERIFYING OBSERVATION

		0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
SEM	0 < 1/2	463	245	376	304	70	34	1392
	1/2 < 1	355	729	628	347	101	70	2130
	1 < 3	217	759	8053	4714	1056	1076	15875
	3 < 5	194	250	6394	16909	6871	4582	38170
	5 < 7	40	67	1150	8552	14788	8850	33447
	7 +	31	72	853	3032	11466	259208	274662
COLUMN TOTALS:		1170	2122	17354	33658	34352	273820	362476
BIASES:		1.10	0.96	0.91	1.04	0.97	1.00	

PERCENT CORRECT: 81.8055
 REIDNE SKILL SCORE: 0.57825
 CHI SCORE: 237.11
 THREAT SCORE: 0.34376

CASES = 362476

VISIBILITY (MILES)

VERIFYING OBSERVATION

		0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
PERSISTENCE	0 < 1/2	470	285	310	237	83	46	1431
	1/2 < 1	263	734	709	279	117	89	2191
	1 < 3	211	747	8463	5409	1271	1311	17412
	3 < 5	164	221	5927	16438	6600	4503	33853
	5 < 7	33	53	1151	8407	15180	9719	34543
	7 +	29	82	794	2988	11101	256152	273046
COLUMN TOTALS:		1170	2122	17354	33658	34352	273820	362476
BIASES:		1.22	1.03	1.00	1.01	1.01	1.00	

PERCENT CORRECT: 82.6088
 REIDNE SKILL SCORE: 0.57676
 CHI SCORE: 65.04
 THREAT SCORE: 0.33940

CASES = 362476

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS
0 - 10	312442	14731	2682	87	9	329951
11 - 20	9920	8081	2821	65	0	20887
21 - 30	2463	3074	5258	789	18	11602
31 - 40	4	5	4	23	0	36
41 +	0	0	0	0	0	0
COLUMN TOTALS:	324829	25891	10765	964	27	362476
BIASES:	1.02	0.81	1.08	0.04	0.00	

PERCENT CORRECT: 89.8829
HEIDKE SKILL SCORE: 0.43544
CHI SCORE: 2033.32

CASES = 362476

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS
0 - 10	309184	13476	2620	91	9	325380
11 - 20	13184	9325	2914	63	0	25486
21 - 30	2422	3034	4732	468	0	10656
31 - 40	35	51	499	324	18	927
41 +	4	5	0	18	0	27
COLUMN TOTALS:	324829	25891	10765	964	27	362476
BIASES:	1.00	0.98	0.99	0.96	1.00	

PERCENT CORRECT: 89.2652
HEIDKE SKILL SCORE: 0.43403
CHI SCORE: 9.79

CASES = 362476

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	119	377	80	50	8	100	1074
200 - 400	451	6646	2028	733	89	871	10818
500 - 900	64	1632	5006	1647	136	1150	9835
GEM 1000 - 2900	28	587	2106	13790	2372	3776	22657
3000 - 6000	10	41	100	2180	28971	12930	44292
CLR BELOW 6001	241	677	681	3642	11654	256993	274086
COLUMN TOTALS	1013	9960	10003	22024	43430	276046	341476
BIASES	1.06	1.09	0.98	1.03	1.02	0.99	

PERCENT CORRECT: 99.9710
 HEIDKE SKILL SCORE: 0.65290
 CHI SCORE: 187.00
 THREAT SCORE: 0.950701

CASES = 361476

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	194	450	109	37	0	315	1105
200 - 400	375	6245	1904	672	87	732	10015
500 - 900	105	1765	4953	1713	113	1180	9831
PERSISTENCE 1000 - 2900	39	650	2167	13322	2167	3700	22045
3000 - 6000	12	71	163	2537	28057	12439	43279
CLR BELOW 6001	288	779	707	3743	13006	257678	276201
COLUMN TOTALS	1013	9960	10003	22024	43430	276046	341476
BIASES	1.09	1.01	0.98	1.00	1.00	1.00	

PERCENT CORRECT: 95.6468
 HEIDKE SKILL SCORE: 0.64134
 CHI SCORE: 11.23
 THREAT SCORE: 0.48461

CASES = 361476

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	207987	18858	3603	2838	233286
	SCT	16997	17809	7678	8840	51324
GEM	BKN	1861	3128	2868	3959	11816
	OVC	3025	6381	8619	48025	66050
	COLUMN TOTALS:	229870	46176	22768	63662	362476
	BIASES:	1.01	1.11	0.52	1.04	

PERCENT CORRECT: 76.3331
HEIDKE SKILL SCORE: 0.56154
CHI SCORE: 5982.47

CASES = 362476

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	206147	17928	3357	2666	230098
	SCT	17470	16133	6186	6314	46103
PERSISTENCE	BKN	3406	6265	5133	8045	22849
	OVC	1847	5850	8092	46637	63426
	COLUMN TOTALS:	229870	46176	22768	63662	362476
	BIASES:	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 75.6050
HEIDKE SKILL SCORE: 0.55365
CHI SCORE: 1.50

CASES = 362476

GEM VER PERSISTENCE 80 MINUTE PROJECTION

PRESSURE (INCHES)

VERIFYING OBSERVATION

	29.236-	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.416	30.417- 30.564	ROW TOTAL
29.236 - 29.236	1	28	0	0	0	0	0	0	0	29
29.236 - 29.530	25	3396	433	0	0	0	0	0	0	3824
29.531 - 29.677	0	347	11386	1398	0	0	0	0	0	13031
29.678 - 29.825	0	24	1431	35398	4773	0	0	0	0	41626
29.826 - 29.973	0	0	0	4843	77953	5358	0	0	0	83054
29.974 - 30.120	0	0	0	0	5488	82747	4817	0	0	93052
30.121 - 30.268	0	0	0	0	0	5001	69481	2778	0	75259
30.269 - 30.416	0	0	0	0	0	0	2649	13269	234	36141
30.417 - 30.564	0	0	0	0	0	0	0	165	1808	1973
ALL MN TOTALS	30	3795	13250	41639	88214	93006	76947	36210	2042	353111
BIASES:	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 99.9256
 REMAINING GEM: 1.65974
 GEM SCORE: 8.1

VER PERSISTENCE

PRESSURE (INCHES)

VERIFYING OBSERVATION

	29.236-	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.416	30.417- 30.564	ROW TOTALS
29.236 - 29.236	1	28	0	0	0	0	0	0	0	29
29.236 - 29.530	25	3396	433	0	0	0	0	0	0	3824
29.531 - 29.677	0	347	11386	1398	0	0	0	0	0	13031
29.678 - 29.825	0	24	1431	35398	4773	0	0	0	0	41626
29.826 - 29.973	0	0	0	4843	77953	5358	0	0	0	83054
29.974 - 30.120	0	0	0	0	5488	82747	4817	0	0	93052
30.121 - 30.268	0	0	0	0	0	5001	69481	2778	0	75259
30.269 - 30.416	0	0	0	0	0	0	2649	13269	234	36141
30.417 - 30.564	0	0	0	0	0	0	0	165	1808	1973
ALL MN TOTALS	30	3795	13250	41639	88214	93006	76947	36210	2042	353111
BIASES:	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 1.0
 REMAINING GEM: 0.00000
 GEM SCORE: 1.0

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 14	0	465	27	19	8	0	0	0	0	0	0	0	0	0	519
15 - 24	0	245	5968	2935	243	76	4	0	0	0	0	0	0	0	9471
25 - 34	0	5	3739	34414	6359	1570	451	105	1	0	0	0	0	0	45544
35 - 39	0	0	0	7588	20726	6276	1076	434	104	2	0	0	0	0	36206
40 - 44	0	0	0	660	8111	17284	5479	1158	350	84	0	0	0	0	33126
45 - 49	0	0	0	47	961	6724	13113	4796	1161	316	30	0	0	0	27148
50 - 54	0	0	0	0	117	1049	6232	14296	4685	1158	250	0	0	0	27787
55 - 59	0	0	0	0	2	83	967	5751	12367	4167	1373	0	0	0	24730
60 - 64	0	0	0	0	0	25	147	1080	4832	13657	6825	79	0	0	26645
65 - 74	0	0	0	0	0	0	1	113	938	6817	50583	8648	50	0	67150
75 - 84	0	0	0	0	0	0	0	0	7	56	7330	25768	4705	0	37866
85 - 94	0	0	0	0	0	0	0	0	0	0	178	4011	12898	571	17658
95 +	0	0	0	0	0	0	0	0	0	0	0	31	469	773	1275
COLUMN TOTALS:	0	715	6734	45663	36437	33687	27490	27733	24445	26357	66569	38537	18122	1344	355123
BIASES:	99.99	0.75	1.08	1.00	0.99	1.00	0.99	1.00	1.01	1.01	1.01	0.98	0.97	0.95	

PERCENT CORRECT: 62.6014
 HEIDKE SKILL SCORE: 0.58062
 CHI SCORE: 163.42

CASES = 355123

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	< 5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
< 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 14	0	465	27	19	8	0	0	0	0	0	0	0	0	0	519
15 - 24	0	245	5968	2935	243	76	4	0	0	0	0	0	0	0	9471
25 - 34	0	5	2739	34414	6259	1570	451	105	1	0	0	0	0	0	45544
35 - 39	0	0	0	7588	20726	6276	1076	434	104	2	0	0	0	0	36206
40 - 44	0	0	0	660	8111	17284	5479	1158	350	84	0	0	0	0	32126
45 - 49	0	0	0	47	961	6724	13113	4796	1161	316	30	0	0	0	27148
50 - 54	0	0	0	0	117	1049	6222	14296	4685	1158	250	0	0	0	27787
55 - 59	0	0	0	0	2	83	587	5751	12367	4167	1373	0	0	0	24730
60 - 64	0	0	0	0	0	25	147	1080	4832	13657	6825	79	0	0	26645
65 - 74	0	0	0	0	0	0	1	113	938	6817	50583	8648	50	0	67150
75 - 84	0	0	0	0	0	0	0	0	7	56	7330	25768	4705	0	37866
85 - 94	0	0	0	0	0	0	0	0	0	0	178	4011	12898	571	17658
95 +	0	0	0	0	0	0	0	0	0	0	0	31	469	773	1273
COLUMN TOTALS:	0	715	8734	45663	36427	33087	27490	27733	24445	26257	66569	38537	18122	1344	355123
BIASES:	99.99	0.73	1.08	1.00	0.99	1.00	0.99	1.00	1.01	1.01	1.01	0.98	0.97	0.95	

PERCENT CORRECT: 62.6014
HEIDKE SKILL SCORE: 0.58062
CHI SCORE: 163.42

CASES = 355123

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS
GEM						
0 - 1	9991	9892	1396	17	0	21296
2 - 7	10520	104132	18559	650	1	133862
8 - 15	232	19017	90761	15254	113	125377
16 - 25	1	374	13673	42499	4535	61082
26 +	0	0	172	3602	9732	13506
COLUMN TOTALS:	20744	133415	124561	62022	14381	355123
BIASES:	1.03	1.00	1.01	0.98	0.94	

PERCENT CORRECT: 72.4017
HEIDKE SKILL SCORE: 0.60544
CHI SCORE: 89.02

CASES = 355123

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS
PERSISTENCE						
0 - 1	9997	9853	1395	17	0	21262
2 - 7	10514	104171	18560	650	1	133896
8 - 15	232	19017	90761	15254	113	125377
16 - 25	1	374	13673	42499	4535	61082
26 +	0	0	172	3602	9732	13506
COLUMN TOTALS:	20744	133415	124561	62022	14381	355123
BIASES:	1.02	1.00	1.01	0.98	0.94	

PERCENT CORRECT: 72.4143
HEIDKE SKILL SCORE: 0.60560
CHI SCORE: 87.50

CASES = 355123

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
	0 - 1	3668	9264	75	0	13007
	2 - 9	11832	261537	19027	112	292508
GEM	10 - 19	17	17178	30271	1256	48723
	20 - 29	0	32	470	380	885
	30 +	0	0	0	0	0
COLUMN TOTALS:	15517	288011	49843	1748	4	355123
BIASES:	0.84	1.02	0.98	0.51	0.00	

PERCENT CORRECT: 83.3109

HEIDKE SKILL SCORE: 0.46356

CHI SCORE: 931.47

CASES = 355123

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
	0 - 1	4023	11508	86	0	15617
	2 - 9	11476	258181	18894	116	288667
PERSISTENCE	10 - 19	18	18239	29850	1046	49154
	20 - 29	0	83	1013	583	1682
	30 +	0	0	0	3	3
COLUMN TOTALS:	15517	288011	49843	1748	4	355123
BIASES:	1.01	1.00	0.99	0.96	0.75	

PERCENT CORRECT: 82.4044

HEIDKE SKILL SCORE: 0.44967

CHI SCORE: 14.40

CASES = 355123

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
GEM	0 - 44	22439	6877	1884	966	794	475	2605	48698
	45 - 89	6505	8783	3204	1087	700	392	2141	25989
	90 - 134	1373	2673	6457	3088	1423	654	1714	19011
	135 - 179	634	764	2188	7774	6931	1353	2712	24293
	180 - 224	828	589	1312	5751	35200	10090	4347	60547
	225 - 269	624	335	536	1522	8549	9438	5605	28722
	270 - 314	2643	2051	1560	2380	4199	4824	22443	55359
	315 - 359	13898	3832	1764	1964	1937	1628	12574	92504
COLUMN TOTALS:		48944	25904	18905	24532	59733	28854	54137	355123
BIASES:		0.99	1.00	1.01	0.99	1.01	1.00	1.02	0.98

PERCENT CORRECT: 47.1501

HEIDKE SKILL SCORE: 0.37094

CHI SCORE: 71.26

CASES = 355123

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
PERSISTENCE	0 - 44	22439	6877	1884	967	798	475	2605	48707
	45 - 89	6505	8783	3204	1090	703	392	2141	25996
	90 - 134	1373	2673	6457	3088	1423	654	1714	19011
	135 - 179	634	764	2188	7787	6961	1353	2712	24336
	180 - 224	828	589	1312	5738	35170	10090	4343	60504
	225 - 269	635	341	538	1522	8566	9556	5646	28927
	270 - 314	2621	2045	1558	2376	4175	4706	22353	54172
	315 - 359	13909	3832	1764	1964	1937	1628	12623	93470
COLUMN TOTALS:		48944	25904	18905	24532	59733	28854	54137	355123
BIASES:		1.00	1.00	1.01	0.99	1.01	1.00	1.00	0.99

PERCENT CORRECT: 47.4084

HEIDKE SKILL SCORE: 0.37383

CHI SCORE: 18.20

CASES = 355123

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS
0 - 100	192	317	48	64	43	193	316	1160
200 - 400	292	6428	1929	497	152	1247	573	11118
500 - 900	149	2565	5785	1745	392	911	636	12183
GEM 1000 - 2900	66	964	2986	18070	3737	3571	671	30065
3000 - 6000	44	393	314	5908	43834	16697	448	67638
CLR BELOW 6001	321	1006	698	4077	17101	201854	1272	226329
X/-X	134	1084	552	357	293	1092	3115	6627
COLUMN TOTALS:	1198	12757	12312	30718	65552	225555	7031	355123
BIASES:	0.97	0.87	0.99	0.98	1.03	1.00	0.94	

PERCENT CORRECT: 79.6426
HEIDKE SKILL SCORE: 0.61170
CHI SCORE: 319.08
THREAT SCORE: 0.38033

CASES = 355123

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS
0 - 100	195	317	48	68	43	186	316	1173
200 - 400	316	6945	2509	781	218	1425	646	12840
500 - 900	133	2313	5597	2094	481	853	580	12051
PERSISTENCE 1000 - 2900	81	742	2629	18303	4637	3774	525	30691
3000 - 6000	18	311	186	4957	42690	16336	401	64899
CLR BELOW 6001	321	1000	701	4072	17118	201694	1211	226117
X/-X	134	1129	642	443	365	1287	3352	7352
COLUMN TOTALS:	1198	12757	12312	30718	65552	225555	7031	355123
BIASES:	0.98	1.01	0.98	1.00	0.99	1.00	1.05	

PERCENT CORRECT: 78.5013
HEIDKE SKILL SCORE: 0.61016
CHI SCORE: 29.16
THREAT SCORE: 0.39490

CASES = 355123

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS	
GEM	0 - 100	192	82	88	82	0	666	1110
	200 - 400	241	505	236	126	95	658	1861
	500 - 900	53	193	874	888	121	1654	3783
	1000 - 2900	144	244	1059	5203	1755	5590	13995
	3000 - 6000	7	17	122	1687	23850	28548	54231
	CLR BELOW 6001	463	788	1848	5490	17342	254212	280143
	COLUMN TOTALS:	1100	1829	4227	13476	43163	291328	355123
	BIASES:	1.01	1.02	0.89	1.04	1.26	0.96	

PERCENT CORRECT: 80.2077
 HEIDKE SKILL SCORE: 0.40498
 CHI SCORE: 3334.80
 THREAT SCORE: 0.20902

CASES = 355123

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS	
PERSISTENCE	0 - 100	216	132	95	108	0	666	1217
	200 - 400	243	499	239	127	97	640	1845
	500 - 900	43	147	930	1141	142	1733	4136
	1000 - 2900	133	236	946	4888	1863	5461	13527
	3000 - 6000	7	13	126	1598	20966	20017	42727
	CLR BELOW 6001	458	802	1891	5614	20095	262811	291671
COLUMN TOTALS:	1100	1829	4227	13476	43163	291328	355123	
BIASES:	1.11	1.01	0.98	1.00	0.99	1.00		

PERCENT CORRECT: 81.7491
 HEIDKE SKILL SCORE: 0.41122
 CHI SCORE: 19.54
 THREAT SCORE: 0.22240

CASES = 355123

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	0	0	0	0	0	0	0
200 - 400	0	0	0	0	0	0	0
500 - 900	0	1	1	3	6	27	38
GEM 1000 - 2900	1	25	81	359	294	1368	2128
3000 - 6000	3	144	442	400	4239	12721	17949
CLR BELOW 6001	50	478	1895	2119	11024	319442	335008
COLUMN TOTALS:	54	648	2419	2881	15563	333558	355123
BIASES:	0.00	0.00	0.02	0.74	1.15	1.00	

PERCENT CORRECT: 91.2475

HEIDKE SKILL SCORE: 0.21618

CHI SCORE: 3614.51

THREAT SCORE: 0.00000

CASES = 355123

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	0	0	0	1	1	54	56
200 - 400	3	7	25	27	105	504	671
500 - 900	1	17	205	53	346	1797	2419
PERSISTENCE 1000 - 2900	4	21	148	386	371	1875	2805
3000 - 6000	3	119	347	413	3718	10967	15567
CLR BELOW 6001	43	484	1694	2001	11022	318361	333605
COLUMN TOTALS:	54	648	2419	2881	15563	333558	355123
BIASES:	1.04	1.04	1.00	0.97	1.00	1.00	

PERCENT CORRECT: 90.8634

HEIDKE SKILL SCORE: 0.20967

CHI SCORE: 1.90

THREAT SCORE: 0.00000

CASES = 355123

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	203351	22981	2152	1597	230081
	SCT	19851	40728	10553	11218	82350
GEM	BKN	83	921	615	1197	2816
	OVC	1653	7639	6473	24111	39876
	COLUMN TOTALS:	224938	72269	19793	38123	355123
	BIASES:	1.02	1.14	0.14	1.05	

PERCENT CORRECT: 75.6935
HEIDKE SKILL SCORE: 0.54133
CHI SCORE: 16166.06

CASES = 355123

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	200585	21276	1994	1494	225349
	SCT	20645	36559	7438	7325	71967
PERSISTENCE	BKN	2076	7294	4412	5962	19744
	OVC	1632	7140	5949	23342	38063
	COLUMN TOTALS:	224938	72269	19793	38123	355123
	BIASES:	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 74.5933
HEIDKE SKILL SCORE: 0.53143
CHI SCORE: 2.23

CASES = 355123

CLOUD COVER TWO

VERIFYING OBSERVATION

		CLR BELOW				ROW TOTALS
		6001	SCT	BKN	OVC	
GEM	CLR BELOW 6001	266233	15013	7928	6602	295776
	SCT	15033	8117	5085	2607	30842
	BKN	3821	2423	3083	1781	11108
	OVC	8120	2069	3002	4206	17397
COLUMN TOTALS:		293207	27622	19098	15196	355123
BIASES:		1.01	1.12	0.58	1.14	

PERCENT CORRECT: 79.3075

HEIDKE SKILL SCORE: 0.31436

CHI SCORE: 4059.43

CASES = 35512

CLOUD COVER TWO

VERIFYING OBSERVATION

		CLR BELOW				ROW TOTALS
		6001	SCT	BKN	OVC	
PERSISTENCE	CLR BELOW 6001	264765	14112	7894	6739	293510
	SCT	14304	7357	3974	1866	27501
	BKN	7456	4244	4613	2749	19062
	OVC	6682	1909	2517	3842	15050
COLUMN TOTALS:		293207	27622	19098	15196	355123
BIASES:		1.00	1.00	1.00	0.99	

PERCENT CORRECT: 79.0084

HEIDKE SKILL SCORE: 0.31596

CHI SCORE: 2.31

CASES = 35512

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
GEM CLR BELOW 6001	315345	5626	6110	5644	332725
GEM SCT	2570	351	442	262	3625
GEM BKN	6054	965	1308	1119	9446
GEM OVC	5536	475	1218	2098	9327
COLUMN TOTALS:	329505	7417	9078	9123	355123
BIASES:	1.01	0.49	1.04	1.02	

PERCENT CORRECT: 89.8568
HEIDKE SKILL SCORE: 0.21426
CHI SCORE: 1989.64

CASES = 355123

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
PERSISTENCE CLR BELOW 6001	312874	5297	5806	5615	329592
PERSISTENCE SCT	5451	700	780	442	7373
PERSISTENCE BKN	5771	954	1288	1038	9051
PERSISTENCE OVC	5409	466	1204	2028	9107
COLUMN TOTALS:	329505	7417	9078	9123	355123
BIASES:	1.00	0.99	1.00	1.00	

PERCENT CORRECT: 89.2339
HEIDKE SKILL SCORE: 0.21473
CHI SCORE: 0.39

CASES = 355123

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
	0 < 1/2	357	225	266	197	77	1179
	1/2 < 1	254	691	594	210	102	1948
GEM	1 < 3	291	770	7459	4849	1135	15824
	3 < 5	174	258	6444	15701	6666	34508
	5 < 7	46	74	1329	8652	13721	32855
	7 +	36	86	922	3330	11943	268816
COLUMN TOTALS:	1158	2104	17014	32939	33664	268244	355123
BIASES:	1.01	0.93	0.93	1.05	0.98	1.00	

PERCENT CORRECT: 81.7824

HEIDKE SKILL SCORE: 0.55378

CHI SCORE: 190.16

THREAT SCORE: 0.31433

CASES = 355123

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
	0 < 1/2	407	270	329	238	98	1417
	1/2 < 1	263	708	665	274	143	2167
PERSISTENCE	1 < 3	248	727	7798	5375	1275	17058
	3 < 5	174	241	6006	15352	6367	33166
	5 < 7	36	70	1292	8453	14158	33881
	7 +	30	88	924	3247	11623	267434
COLUMN TOTALS:	1158	2104	17014	32939	33664	268244	355123
BIASES:	1.22	1.03	1.00	1.01	1.01	1.00	

PERCENT CORRECT: 81.6464

HEIDKE SKILL SCORE: 0.55355

CHI SCORE: 68.34

THREAT SCORE: 0.31705

CASES = 355123

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS	
	0 - 10	305893	14553	2655	84	8	323193
	11 - 20	9715	7807	2953	70	0	20545
GEM	21 - 30	2584	3014	4974	764	14	11350
	31 - 40	9	0	8	13	5	35
	41 +	0	0	0	0	0	0
COLUMN TOTALS:	318201	25374	10590	931	27		355123
BIASES:	1.02	0.81	1.07	0.04	0.00		

PERCENT CORRECT: 89.7399

HEIDKE SKILL SCORE: 0.42824

CHI SCORE: 1941.19

CASES = 355123

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS	
	0 - 10	302659	13315	2707	89	8	318778
	11 - 20	12953	9036	2931	66	0	24986
PERSISTENCE	21 - 30	2535	2956	4484	442	1	10418
	31 - 40	45	67	466	323	13	914
	41 +	9	0	2	11	5	27
COLUMN TOTALS:	318201	25374	10590	931	27		355123
BIASES:	1.00	0.98	0.98	0.98	1.00		

PERCENT CORRECT: 89.1260

HEIDKE SKILL SCORE: 0.42696

CHI SCORE: 10.08

CASES = 355123

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	160	390	78	70	4	319	1001
200 - 400	447	6315	2210	843	102	989	10906
500 - 900	87	1600	4523	1654	152	1250	8166
GEM 1000 - 2900	38	608	2205	13085	2464	4087	22487
3000 - 6000	5	71	136	2266	27409	13159	40047
CLR BELOW 6001	281	719	672	3693	12520	250471	265356
COLUMN TOTALS:	999	9763	9824	21611	42651	271275	355123
BIASES:	1.02	1.12	0.95	1.04	1.01	0.99	

PERCENT CORRECT: 55.0305
 HEIDKE SKILL SCORE: 0.63028
 CHI SCORE: 214.42
 THREAT SCORE: 0.47552

CASES = 355123

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	149	463	98	40	3	329	1082
200 - 400	400	5793	1998	726	78	812	9807
500 - 900	104	1909	4537	1664	149	1279	9642
PERSISTENCE 1000 - 2900	49	686	2232	12608	2213	3864	21652
3000 - 6000	4	108	185	2673	26769	12712	42451
CLR BELOW 6001	293	804	774	3900	13439	251279	270489
COLUMN TOTALS:	999	9763	9824	21611	42651	270275	355123
BIASES:	1.02	1.00	0.98	1.00	1.00	1.00	

PERCENT CORRECT: 84.7974
 HEIDKE SKILL SCORE: 0.62062
 CHI SCORE: 11.85
 THREAT SCORE: 0.49037

CASES = 355123

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	203154	19287	4038	3284	229763
	SCT	17028	17206	7814	9885	51933
GEM	BKN	1291	2066	1951	2906	8214
	OVC	3465	6778	8603	46367	65213
	COLUMN TOTALS:	224938	45337	22406	62442	355123
	BIASES:	1.02	1.15	0.37	1.04	

PERCENT CORRECT: 75.6577
HEIDKE SKILL SCORE: 0.54735
CHI SCORE: 10175.35

CASES = 355123

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	200585	17981	3695	3088	225349
	SCT	17524	15189	5781	6646	45140
PERSISTENCE	BKN	3590	6074	4954	7796	22414
	OVC	3239	6093	7976	44912	62220
	COLUMN TOTALS:	224938	45337	22406	62442	355123
	BIASES:	1.00	1.00	1.00	1.00	

PERCENT CORRECT: 74.8023
HEIDKE SKILL SCORE: 0.53938
CHI SCORE: 2.40

CASES = 355123

GEM VS. PERSISTENCE 90 MINUTE PROJECTION

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTALS
GEM										
0 - 29.235	0	30	0	0	0	0	0	0	0	30
29.236 - 29.530	31	3337	487	0	0	0	0	0	0	3855
29.531 - 29.677	0	390	11199	1552	6	0	0	0	0	13147
29.678 - 29.825	0	29	1592	34719	5236	0	0	0	0	41576
29.826 - 29.973	0	0	0	5352	76859	5821	0	0	0	88032
29.974 - 30.120	0	0	0	0	6123	81548	5335	0	0	93011
30.121 - 30.268	0	0	0	0	0	5572	68641	3072	0	77085
30.269 - 30.563	0	0	0	0	0	0	2924	32907	251	36082
30.564 +	0	0	0	0	0	0	0	183	1782	1965
COLUMN TOTALS:	31	3786	13278	41623	88229	92941	76900	36162	2033	154983
BIASES:	0.97	1.02	0.99	1.00	1.00	1.00	1.01	1.00	0.97	

REFLECT CURRENT: 57.6076
 REFLECT STILL SCORE: 0.34451
 CHI SCORE: 7.51

A/E: 0.34451

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTALS
PERSISTENCE										
0 - 29.235	0	30	0	0	0	0	0	0	0	30
29.236 - 29.530	31	3337	487	0	0	0	0	0	0	3855
29.531 - 29.677	0	390	11199	1552	6	0	0	0	0	13147
29.678 - 29.825	0	29	1592	34719	5236	0	0	0	0	41576
29.826 - 29.973	0	0	0	5352	76859	5821	0	0	0	88032
29.974 - 30.120	0	0	0	0	6123	81548	5335	0	0	93011
30.121 - 30.268	0	0	0	0	0	5572	68641	3072	0	77085
30.269 - 30.563	0	0	0	0	0	0	2924	32907	251	36082
30.564 +	0	0	0	0	0	0	0	183	1782	1965
COLUMN TOTALS:	31	3786	13278	41623	88229	92941	76900	36162	2033	154983
BIASES:	0.97	1.02	0.99	1.00	1.00	1.00	1.01	1.00	0.97	

REFLECT CURRENT: 57.6076
 REFLECT STILL SCORE: 0.34451
 CHI SCORE: 7.51

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 14	0	459	42	22	6	4	0	0	0	0	0	0	0	0	533
15 - 24	0	268	5605	2943	326	106	18	0	0	0	0	0	0	0	9466
25 - 34	0	5	2916	33713	6309	1801	568	180	12	0	0	0	0	0	4504
35 - 39	0	0	1	7921	20155	6356	1152	534	178	13	0	0	0	0	36190
40 - 44	0	0	0	878	8310	16633	5487	1367	428	140	4	0	0	0	33147
45 - 49	0	0	0	70	1223	6839	12519	4791	1246	444	67	0	0	0	27199
50 - 54	0	0	0	0	154	1324	6360	13719	4602	1231	393	0	0	0	27783
55 - 59	0	0	0	0	4	138	1151	5794	11950	4079	1596	4	0	0	24716
60 - 64	0	0	0	0	0	36	226	1260	4807	13134	7063	152	0	0	26678
65 - 74	0	0	0	0	0	0	2	189	1216	7090	49177	9462	90	0	67226
75 - 84	0	0	0	0	0	0	0	0	14	88	7964	24447	5177	0	37690
85 - 94	0	0	0	0	0	0	0	0	0	0	248	4357	12387	608	17600
95 +	0	0	0	0	0	0	0	0	0	0	0	41	488	722	1251
COLUMN TOTALS:	0	732	8764	45547	36487	33117	27463	27734	24455	26219	66512	36463	16142	1330	354963
BIASES:	99.99	0.73	1.08	1.00	0.99	1.06	0.99	1.00	1.01	1.02	1.01	0.98	0.97	0.94	

PERCENT CORRECT: 60.5156
 HEIDKE SKILL SCORE: 0.55704
 CHI SCORE: 170.79

CASES = 354963

TEMPERATURE (DEGREES FAHRENHEIT)

	VERIFYING OBSERVATION														95 +	ROW TOTALS
	< 5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94			
PERSISTENCE																
< 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 14	0	459	42	22	6	4	0	0	0	0	0	0	0	0	0	533
15 - 24	0	268	5805	2943	326	106	18	0	0	0	0	0	0	0	0	9466
25 - 34	0	5	2916	33713	6309	1801	568	180	12	0	0	0	0	0	0	45504
35 - 39	0	0	1	7921	20155	6236	1152	534	178	13	0	0	0	0	0	36190
40 - 44	0	0	0	878	8310	16633	5487	1267	428	140	4	0	0	0	0	33147
45 - 49	0	0	0	70	1223	6839	12519	4791	1246	444	67	0	0	0	0	27199
50 - 54	0	0	0	0	154	1324	6360	13719	4602	1231	393	0	0	0	0	27783
55 - 59	0	0	0	0	4	138	1151	5794	11950	4079	1596	4	0	0	0	24716
60 - 64	0	0	0	0	0	36	225	1260	4807	13134	7063	152	0	0	0	26678
65 - 74	0	0	0	0	0	0	2	189	1216	7090	49177	9462	90	0	0	67226
75 - 84	0	0	0	0	0	0	0	0	14	88	7964	24447	5177	0	0	37690
85 - 94	0	0	0	0	0	0	0	0	0	0	248	4357	12387	608	0	17600
95 +	0	0	0	0	0	0	0	0	0	0	0	41	488	722	0	1251
COLUMN TOTALS:	0	732	8764	45547	36487	33117	27483	27734	24453	26219	66512	38463	18142	1330		354983
BIASES:	99.99	0.73	1.08	1.00	0.99	1.00	0.99	1.00	1.01	1.02	1.01	0.98	0.97	0.94		

PERCENT CORRECT: 60.5156
 HEIDKE SKILL SCORE: 0.55724
 CHI SCORE: 170.79

CASES = 354983

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS	
	0 - 1	10221	9214	1752	44	0	21231
	2 - 7	10169	103739	19284	915	3	134110
GEM	8 - 15	278	20138	88630	16229	167	125442
	16 - 25	2	514	14522	40881	4885	60804
	26 +	0	0	260	3822	9314	13396
COLUMN TOTALS:		20670	133605	124448	61891	14369	354983
BIASES:		1.03	1.00	1.01	0.98	0.93	

PERCENT CORRECT: 71.2105
HEIDKE SKILL SCORE: 0.58816
CHI SCORE: 110.05

CASES = 354983

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS	
	0 - 1	10221	9189	1751	44	0	21205
	2 - 7	10169	103764	19285	915	3	134136
PERSISTENCE	8 - 15	278	20138	88630	16229	167	125442
	16 - 25	2	514	14522	40881	4885	60804
	26 +	0	0	260	3822	9314	13396
COLUMN TOTALS:		20670	133605	124448	61891	14369	354983
BIASES:		1.03	1.00	1.01	0.98	0.93	

PERCENT CORRECT: 71.2175
HEIDKE SKILL SCORE: 0.58825
CHI SCORE: 108.88

CASES = 354983

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
	0 - 1	3515	8671	69	0	12255
	2 - 9	12041	261594	19664	125	293424
GEM	10 - 19	23	17565	29668	1299	48557
	20 - 29	0	30	368	347	747
	30 +	0	0	0	0	0
COLUMN TOTALS:	15579	287860	49769	1771	4	354983
BIASES:	0.79	1.02	0.98	0.42	0.00	

PERCENT CORRECT: 83.1375

HEIDKE SKILL SCORE: 0.45430

CHI SCORE: 1442.36

CASES = 354983

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
	0 - 1	3899	11702	85	0	15686
	2 - 9	11655	257365	19484	128	288632
PERSISTENCE	10 - 19	25	18705	29191	1066	48987
	20 - 29	0	88	1009	573	1674
	30 +	0	0	0	4	4
COLUMN TOTALS:	15579	287860	49769	1771	4	354983
BIASES:	1.01	1.00	0.98	0.95	1.00	

PERCENT CORRECT: 81.9836

HEIDKE SKILL SCORE: 0.43584

CHI SCORE: 10.41

CASES = 354983

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
GEM	0 - 44	21936	6902	1905	1017	796	501	2743	48609
	45 - 89	6563	8364	3254	1194	822	367	2125	25950
	90 - 134	1478	2663	6117	3089	1468	689	1802	18945
	135 - 179	655	807	2242	7433	6932	1388	2749	24255
	180 - 224	917	584	1377	5804	34616	10233	4482	60614
	225 - 269	646	391	524	1512	8581	9091	5709	28715
	270 - 314	2763	2209	1559	2503	4539	4899	21618	55501
	315 - 359	13964	3929	1850	1980	1736	12901	54075	92394
COLUMN TOTALS:		48922	25849	18828	24532	59713	28904	54129	94106
BIASES:		0.99	1.00	1.01	0.99	1.02	0.99	1.03	0.98

PERCENT CORRECT: 45.9881
HEIDKE SKILL SCORE: 0.35708
CHI SCORE: 87.00

CASES = 354983

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
PERSISTENCE	0 - 44	21936	6902	1905	1017	796	503	2746	48619
	45 - 89	6563	8364	3254	1194	824	370	2125	25956
	90 - 134	1478	2663	6117	3089	1468	689	1802	18945
	135 - 179	655	807	2244	7510	6972	1389	2749	24375
	180 - 224	917	584	1375	5727	34576	10231	4482	60493
	225 - 269	653	396	533	1513	8616	9233	5746	28983
	270 - 314	2741	2202	1550	2502	4502	4753	21506	54216
	315 - 359	13979	3929	1850	1980	1736	12973	54990	93396
COLUMN TOTALS:		48922	25849	18828	24532	59713	28904	54129	94106
BIASES:		0.99	1.00	1.01	0.99	1.01	1.00	1.00	0.99

PERCENT CORRECT: 46.2648
HEIDKE SKILL SCORE: 0.36020
CHI SCORE: 19.95

CASES = 354983

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS
GEM								
0 - 100	160	348	44	71	36	206	320	1185
200 - 400	250	5978	2019	490	164	1152	593	10648
500 - 900	183	2817	5500	1889	406	972	679	11446
1000 - 2900	79	1010	3042	17494	3904	3830	671	30030
3000 - 6000	50	435	327	5935	41680	15518	505	64450
CLR BELOW 6001	339	1031	794	4389	19172	202258	1303	229286
X/-X	133	1149	624	405	355	1289	2985	6940
COLUMN TOTALS:	1194	12768	12350	30673	65717	225225	7056	354983
BIASES:	0.99	0.83	1.01	0.98	0.98	1.02	0.98	

PERCENT CORRECT: 77.7657
 HEIDKE SKILL SCORE: 0.59321
 CHI SCORE: 466.52
 THREAT SCORE: 0.35347

CASES = 354983

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS
PERSISTENCE								
0 - 100	160	348	44	71	36	206	320	1185
200 - 400	280	6631	2637	661	228	1500	684	12821
500 - 900	171	2407	5257	2201	504	389	612	12041
1000 - 2900	90	820	2739	17673	4781	4063	538	30704
3000 - 6000	23	346	208	5130	41725	17030	453	64915
CLR BELOW 6001	337	1010	766	4279	18034	200195	1294	225915
X/-X	133	1206	699	458	409	1342	3155	7402
COLUMN TOTALS:	1194	12768	12350	30673	65717	225225	7056	354983
BIASES:	0.99	1.00	0.97	1.00	0.99	1.00	1.05	

PERCENT CORRECT: 77.4110
 HEIDKE SKILL SCORE: 0.59677
 CHI SCORE: 467.92
 THREAT SCORE: 0.35347

CASES = 354983

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	144	63	74	70	0	718	1069
200 - 400	249	448	244	115	102	677	1835
500 - 900	45	197	817	936	126	1634	3755
1000 - 2900	154	249	1101	4937	1821	5955	14217
3000 - 6000	19	22	135	1785	24511	31486	57958
CLR BELOW 6001	481	843	1845	5661	16735	250584	276149
COLUMN TOTALS:	1092	1822	4216	13504	43295	291054	354983
BIASES:	0.98	1.01	0.89	1.05	1.34	0.95	

PERCENT CORRECT: 79.2830
HEIDKE SKILL SCORE: 0.39171
CHI SCORE: 5817.94
THREAT SCORE: 0.18396

CASES = 354983

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	157	123	98	97	0	731	1206
200 - 400	253	452	244	118	102	684	1853
500 - 900	42	141	875	1173	138	1754	4123
1000 - 2900	142	240	986	4579	1915	5643	13505
3000 - 6000	19	23	134	1607	20340	20646	42769
CLR BELOW 6001	479	843	1879	5930	20800	261596	291527
COLUMN TOTALS:	1092	1822	4216	13504	43295	291054	354983
BIASES:	1.10	1.02	0.98	1.00	0.99	1.00	

PERCENT CORRECT: 81.1304
HEIDKE SKILL SCORE: 0.39197
CHI SCORE: 21.64
THREAT SCORE: 0.19747

CASES = 354983

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	0	0	0	0	0	0	0
200 - 400	0	0	0	0	0	0	0
500 - 900	0	0	2	1	0	35	38
GEM 1000 - 2900	0	17	61	243	252	1171	1744
3000 - 6000	2	180	421	424	3961	13277	18265
CLR BELOW 6001	51	453	1943	2189	11398	318902	334936
COLUMN TOTALS:	53	650	2427	2857	15611	333385	354983
BIASES:	0.00	0.00	0.02	0.61	1.17	1.00	

PERCENT CORRECT: 91.0207
HEIDKE SKILL SCORE: 0.19523
CHI SCORE: 3946.60
THREAT SCORE: 0.00000

CASES = 354983

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	0	0	1	3	2	47	53
200 - 400	0	12	35	29	89	505	670
500 - 900	7	19	186	55	360	1803	2430
PERSISTENCE 1000 - 2900	5	28	152	295	383	1941	2804
3000 - 6000	5	106	338	400	3310	11385	15544
CLR BELOW 6001	36	485	1715	2075	11467	317704	333482
COLUMN TOTALS:	53	650	2427	2857	15611	333385	354983
BIASES:	1.00	1.03	1.00	0.98	1.00	1.00	

PERCENT CORRECT: 90.5697
HEIDKE SKILL SCORE: 0.18484
CHI SCORE: 1.92
THREAT SCORE: 0.00649

CASES = 354983

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW	6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	202138	24128	2388	1841	230495
	SCT	20534	39590	10442	11680	82246
GEM	BKN	90	902	708	1069	2769
	OVC	1853	7820	6261	23539	39473
	COLUMN TOTALS:	224615	72440	19799	38129	354983
	BIASES:	1.03	1.14	0.14	1.04	

PERCENT CORRECT: 74.9261
HEIDKE SKILL SCORE: 0.52645
CHI SCORE: 16176.97

CASES = 354983

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW	6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	199067	22128	2237	1729	225161
	SCT	21360	35566	7405	7633	71964
PERSISTENCE	BKN	2250	7345	4265	5951	19811
	OVC	1938	7401	5892	22816	38047
	COLUMN TOTALS:	224615	72440	19799	38129	354983
	BIASES:	1.00	0.99	1.00	1.00	

PERCENT CORRECT: 73.7258
HEIDKE SKILL SCORE: 0.51583
CHI SCORE: 4.64

CASES = 354983

CLOUD COVER TWO

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS	
GEM	CLR BELOW 6001	264565	15346	8129	6688	294728
	SCT	15755	7905	5089	2739	31508
	BKN	4013	2392	2692	1764	10862
	OVC	8585	2079	3168	4053	17885
	COLUMN TOTALS:	292918	27723	19078	15264	354983
	BIASES:	1.01	1.14	0.57	1.17	

PERCENT CORRECT: 78.6559
HEIDKE SKILL SCORE: 0.29828
CHI SCORE: 4516.25

CASES = 354983

CLOUD COVER TWO

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS	
PERSISTENCE	CLR BELOW 6001	263562	14657	8247	6908	293374
	SCT	14673	7004	3812	1959	27448
	BKN	7796	4215	4332	2731	19074
	OVC	6887	1847	2687	3666	15087
	COLUMN TOTALS:	292918	27723	19078	15264	354983
	BIASES:	1.00	0.99	1.00	0.99	

PERCENT CORRECT: 78.4725
HEIDKE SKILL SCORE: 0.29945
CHI SCORE: 5.49

CASES = 354983

CLOUD COVER THREE

VERIFYING OBSERVATION

		CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	314640	5722	6392	5962	332716
GEM	SCT	2503	361	360	215	3439
	BKN	6453	804	1282	998	9537
	OVC	5724	544	1080	1943	9291
	COLUMN TOTALS:	329320	7431	9114	9118	354983
	BIASES:	1.01	0.46	1.05	1.02	

PERCENT CORRECT: 89.6454
HEIDKE SKILL SCORE: 0.19683
CHI SCORE: 2202.47

CASES = 354983

CLOUD COVER THREE

VERIFYING OBSERVATION

		CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	312121	5336	6088	5923	329468
PERSISTENCE	SCT	5508	756	705	368	7337
	BKN	6071	793	1258	954	9076
	OVC	5620	546	1063	1873	9102
	COLUMN TOTALS:	329320	7431	9114	9118	354983
	BIASES:	1.00	0.99	1.00	1.00	

PERCENT CORRECT: 89.0206
HEIDKE SKILL SCORE: 0.19991
CHI SCORE: 1.44

CASES = 354983

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
GEM	0 < 1/2	331	213	258	226	94	1195
	1/2 < 1	221	671	578	341	92	1939
	1 < 3	307	744	7153	4776	1200	15800
	3 < 5	216	320	6589	15111	6678	34847
	5 < 7	56	82	1412	8752	12973	32471
	7 +	32	99	1078	3780	12712	269731
COLUMN TOTALS:		1163	2129	17068	32886	33749	267988
BIASES:		1.03	0.91	0.93	1.06	0.96	1.00

PERCENT CORRECT: 80.9247

HEIDKE SKILL SCORE: 0.53307

CHI SCORE: 279.43

THREAT SCORE: 0.28778

CASES = 354983

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
PERSISTENCE	0 < 1/2	367	257	324	258	114	1418
	1/2 < 1	235	686	656	321	122	2186
	1 < 3	274	701	7530	5244	1387	17075
	3 < 5	200	304	6083	14696	6273	33163
	5 < 7	57	90	1412	8635	13607	34042
	7 +	30	91	1063	3732	12246	267699
COLUMN TOTALS:		1163	2129	17068	32886	33749	267988
BIASES:		1.22	1.03	1.00	1.01	1.01	1.00

PERCENT CORRECT: 80.7991

HEIDKE SKILL SCORE: 0.53377

CHI SCORE: 65.27

THREAT SCORE: 0.28873

CASES = 354993

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS
GEM	0 - 10	305350	14866	2831	98	323153
	11 - 20	9959	7516	2889	73	20437
	21 - 30	2782	2951	4857	762	11365
	31 - 40	8	0	0	16	28
	41 +	0	0	0	0	0
COLUMN TOTALS:						
BIASES:						
	318099	25333	10577	949	25	354983
	1.02	0.81	1.07	0.03	0.00	

PERCENT CORRECT: 89.5082
HEIDKE SKILL SCORE: 0.41449
CHI SCORE: 2004.06

CASES = 354983

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS
PERSISTENCE	0 - 10	302060	13667	2941	112	318782
	11 - 20	13251	8708	2803	65	24827
	21 - 30	2725	2895	4336	471	10428
	31 - 40	55	63	497	288	915
	41 +	8	0	0	13	25
COLUMN TOTALS:						
BIASES:						
	318099	25333	10577	949	25	354983
	1.00	0.98	0.99	0.96	1.00	

PERCENT CORRECT: 88.8482
HEIDKE SKILL SCORE: 0.41120
CHI SCORE: 14.92

CASES = 354983

AD-A190 803

VERY SHORT RANGE STATISTICAL FORECASTING OF AUTOMATED
WEATHER OBSERVATION.. (U) NATIONAL WEATHER SERVICE
SILVER SPRING MD TECHNIQUES DEVELOPM.. R G MILLER

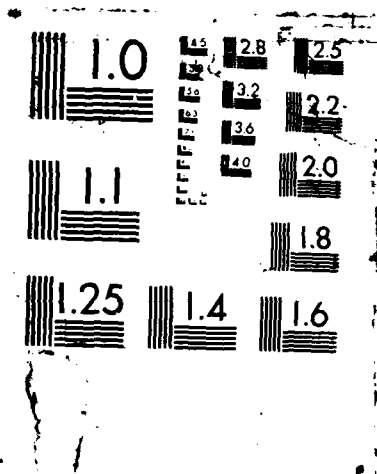
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HILLER
F/G 4/2

ML



CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	172	414	92	49	8	334	1069
200 - 400	453	6059	2335	919	108	1145	11019
500 - 900	81	1788	4091	1580	173	1352	9065
GEM 1000 - 2900	50	673	2409	12733	2508	4368	22741
3000 - 6000	2	103	142	2373	27033	13807	43460
CLR BELOW 6001	229	736	760	3912	12968	249024	267629
COLUMN TOTALS:	987	9773	9829	21566	42798	270030	354983
BIASES:	1.08	1.13	0.92	1.05	1.02	0.99	

PERCENT CORRECT: 84.2609
HEIDKE SKILL SCORE: 0.61261
CHI SCORE: 320.66
THREAT SCORE: 0.45067

CASES = 354983

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	117	462	103	38	7	342	1069
200 - 400	402	5509	2077	815	77	935	9815
500 - 900	123	2067	4240	1678	182	1373	9663
PERSISTENCE 1000 - 2900	50	716	2359	12127	2291	4111	21654
3000 - 6000	0	143	200	2827	26110	13233	42513
CLR BELOW 6001	295	876	850	4081	14131	250036	270269
COLUMN TOTALS:	987	9773	9829	21566	42798	270030	354983
BIASES:	1.08	1.00	0.98	1.00	0.99	1.00	

PERCENT CORRECT: 83.9868
HEIDKE SKILL SCORE: 0.60085
CHI SCORE: 12.27
THREAT SCORE: 0.42827

CASES = 354983

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

		CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	201137	19340	4398	3730	228605
	SCT	18213	16984	7694	10352	53243
GEM	BKN	1346	1943	1871	2822	7982
	OVC	3919	7148	8479	45607	65153
	COLUMN TOTALS:	224615	45415	22442	62511	354983
	BIASES:	1.02	1.17	0.36	1.04	

PERCENT CORRECT: 74.8202
HEIDKE SKILL SCORE: 0.53335
CHI SCORE: 10848.80

CASES = 354983

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

		CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	199067	18395	4141	3558	225161
	SCT	17999	14575	5650	6884	45108
PERSISTENCE	BKN	3845	6029	4745	7859	22478
	OVC	3704	6416	7906	44210	62236
	COLUMN TOTALS:	224615	45415	22442	62511	354983
	BIASES:	1.00	0.99	1.00	1.00	

PERCENT CORRECT: 73.9745
HEIDKE SKILL SCORE: 0.52467
CHI SCORE: 4.67

CASES = 354983

GEM VS. PERSISTENCE 100 MINUTE PROJECTION

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTALS
GEM										
0 - 29.235	0	30	0	0	0	0	0	0	0	30
29.236 - 29.530	29	3274	538	0	0	0	0	0	0	3641
29.531 - 29.677	0	433	10984	1692	15	0	0	0	0	13124
29.678 - 29.825	0	29	1732	34030	5647	0	0	0	0	41428
29.826 - 29.973	0	0	0	5818	75456	6378	0	0	0	87652
29.974 - 30.120	0	0	0	0	6733	80116	5814	0	0	92663
30.121 - 30.268	0	0	0	0	0	6121	67549	3332	0	77002
30.269 - 30.563	0	0	0	0	0	0	3166	32494	275	35935
30.564 +	0	0	0	0	0	0	0	202	1750	1952
COLUMN TOTALS:	29	3766	13254	41540	87851	92615	76529	36026	2025	350637
BIASES:	1.03	1.02	0.99	1.00	1.00	1.00	1.01	1.00	0.96	

PERCENT CORRECT: 86.4313
 HEIDKE SKILL SCORE: 0.82976
 CSI SCORE: 9.02

BIASES = 150637

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTALS
PERSISTENCE										
0 - 29.235	0	30	0	0	0	0	0	0	0	30
29.236 - 29.530	29	3274	538	0	0	0	0	0	0	3641
29.531 - 29.677	0	433	10984	1692	15	0	0	0	0	13124
29.678 - 29.825	0	29	1732	34030	5647	0	0	0	0	41428
29.826 - 29.973	0	0	0	5818	75456	6378	0	0	0	87652
29.974 - 30.120	0	0	0	0	6733	80116	5814	0	0	92663
30.121 - 30.268	0	0	0	0	0	6121	67549	3332	0	77002
30.269 - 30.563	0	0	0	0	0	0	3166	32494	275	35935
30.564 +	0	0	0	0	0	0	0	202	1750	1952
COLUMN TOTALS:	29	3766	13254	41540	87851	92615	76529	36026	2025	350637
BIASES:	1.03	1.02	0.99	1.00	1.00	1.00	1.01	1.00	0.96	

PERCENT CORRECT: 86.4313
 HEIDKE SKILL SCORE: 0.82976
 CSI SCORE: 9.02

BIASES = 150637

TEMPERATURE (DEGREES FAHRENHEIT)

		VERIFYING OBSERVATION												95 + ROW TOTALS	
		5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	
JEM															
5 - 14	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 - 24		0	432	47	31	2	8	0	0	0	0	0	0	0	520
25 - 34		0	297	5630	2941	398	139	43	0	0	0	0	0	0	9448
35 - 39		0	8	3040	32865	6334	2027	670	276	36	0	0	0	0	45256
40 - 44		0	0	3	8171	19457	6281	1243	614	246	46	0	0	0	36061
45 - 49		0	0	0	1145	8481	15803	5445	1463	472	200	18	0	0	33027
50 - 54		0	0	0	102	1501	6835	11894	4700	1365	560	118	0	0	27075
55 - 59		0	0	0	2	220	1641	6362	13039	4570	1291	559	0	0	27684
60 - 64		0	0	0	0	14	203	1363	5841	11310	4079	1816	24	0	24650
65 - 74		0	0	0	0	0	55	345	1393	4888	12314	7354	265	0	26614
75 - 84		0	0	0	0	0	0	6	297	1464	7478	47398	10249	146	67038
85 - 94		0	0	0	0	0	0	0	0	28	130	8620	23094	5640	37512
95 +		0	0	0	0	0	0	0	0	0	0	332	4679	11831	17512
COLUMN TOTALS:		0	737	8720	45257	36407	32992	27371	27623	24379	26098	66215	38359	18140	353637
BIASES:		99.99	0.71	1.98	1.00	0.99	1.00	0.99	1.00	1.01	1.02	1.01	0.98	0.97	0.93

PERCENT CORRECT: 58.1772
 HEIDKE SKILL SCORE: 0.53103
 CHI SCORE: 202.54

CASES = 353637

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
PERSISTENCE	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
5 - 14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 - 24	0	432	47	31	2	8	0	0	0	0	0	0	0	0	520
25 - 34	0	297	5630	2941	398	139	43	0	0	0	0	0	0	0	9448
35 - 39	0	8	3040	32865	6334	2027	670	276	36	0	0	0	0	0	45256
40 - 44	0	0	3	8171	19457	6281	1243	614	246	46	0	0	0	0	36061
45 - 49	0	0	0	1145	8481	15803	5445	1463	472	200	18	0	0	0	33027
50 - 54	0	0	0	102	1501	6835	11894	4700	1365	560	118	0	0	0	27075
55 - 59	0	0	0	2	220	1641	6552	13039	4570	1291	559	0	0	0	27684
60 - 64	0	0	0	0	14	203	1363	5841	11310	4079	1816	24	0	0	24650
65 - 74	0	0	0	0	0	55	345	1393	4888	12314	7354	265	0	0	26614
75 - 84	0	0	0	0	0	0	6	297	1464	7478	47398	10249	146	0	67038
85 - 94	0	0	0	0	0	0	0	0	28	130	8620	23094	5640	0	37512
95 +	0	0	0	0	0	0	0	0	0	0	332	4679	11831	670	17512
COLUMN TOTALS:	0	737	8720	45257	36407	32992	27371	27623	24379	26098	66215	38359	18140	1339	353637
BIASES:	99.99	0.71	1.08	1.00	0.99	1.00	0.99	1.00	1.01	1.02	1.01	0.98	0.97	0.93	

PERCENT CORRECT: 58.1772
 REIDME SKILL SCORE: 0.53103
 CHI SCORE: 202.54

CASES = 353637

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS	
	0 - 1	9604	9265	2177	79	0	21125
	2 - 7	10593	101820	19978	1217	4	133612
GEM	8 - 15	357	21206	86099	17214	228	125104
	16 - 25	4	755	15317	39156	5248	60480
	26 +	0	3	345	4049	8919	13316
	COLUMN TOTALS:	20558	133049	123916	61715	14399	353637
	BIASES:	1.03	1.00	1.01	0.98	0.92	

PERCENT CORRECT: 69.4492

HEIDKE SKILL SCORE: 0.56296

CHI SCORE: 135.58

CASES = 353637

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS	
	0 - 1	9604	9263	2177	79	0	21122
	2 - 7	10593	101820	19978	1217	4	133612
PERSISTENCE	8 - 15	357	21206	86099	17214	228	125106
	16 - 25	4	755	15317	39156	5248	60480
	26 +	0	3	345	4049	8919	13316
	COLUMN TOTALS:	20558	133049	123916	61715	14399	353637
	BIASES:	1.03	1.00	1.01	0.98	0.92	

PERCENT CORRECT: 69.4492

HEIDKE SKILL SCORE: 0.56296

CHI SCORE: 135.51

CASES = 353637

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS	
GEM	0 - 1	3404	8650	86	2	0	12142
	2 - 9	12073	260564	20343	133	0	293113
	10 - 19	16	17432	28846	1298	0	47592
	20 - 29	0	31	414	341	4	790
	30 +	0	0	0	0	0	0
COLUMN TOTALS:		15493	286677	49689	1774	4	353637
BIASES:		0.78	1.02	0.96	0.45	0.00	

PERCENT CORRECT: 82.8972

HEIDKE SKILL SCORE: 0.44410

CHI SCORE: 1507.58

CASES = 353637

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS	
	0 - 1	3793	11721	120	2	0	15636
	2 - 9	11679	255716	19991	135	0	287521
PERSISTENCE	10 - 19	21	19155	28533	1114	0	48823
	20 - 29	0	85	1045	519	4	1653
	30 +	0	0	0	4	0	4
COLUMN TOTALS:							353637
BIASES:							1.01 1.00 0.98 0.93 1.00

PERCENT CORRECT: 81.5981

HEIDKE SKILL SCORE: 0.42413

CHI SCORE: 27.15

CASES = 353637

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

		0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
GEM	0 - 44	21380	6824	2071	1100	859	528	2831	12737	48360
	45 - 89	6535	8020	3257	1225	830	407	2214	3320	18808
	90 - 134	1529	2747	5819	3093	1550	638	1951	1648	18978
	135 - 179	716	806	2346	7031	6880	1371	2857	2086	24093
	180 - 224	983	609	1344	5917	34024	10165	4620	2833	60495
	225 - 269	740	372	598	1355	8529	8678	5596	2328	28196
	270 - 314	2911	2287	1493	2659	4813	5069	20934	15508	58674
	315 - 359	13974	4081	1843	2002	2080	1868	12887	53331	92066
	COLUMN TOTALS:	48768	25746	18771	24382	59565	28724	53890	93791	353637
	BIASES:	0.99	1.00	1.01	0.99	1.02	0.98	1.03	0.98	

PERCENT CORRECT: 45.0227
 HEIDKE SKILL SCORE: 0.34548
 CHI SCORE: 124.74

CASES = 353637

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

		0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
PERSISTENCE	0 - 44	21380	6824	2071	1100	859	532	2832	12742	48347
	45 - 89	6535	8020	3257	1225	830	412	2214	3321	18814
	90 - 134	1529	2747	5819	3093	1550	638	1951	1649	18978
	135 - 179	716	806	2346	7180	6930	1372	2957	2086	24093
	180 - 224	983	609	1344	5768	32974	10164	4620	2833	60298
	225 - 269	750	386	606	1356	8663	8951	8678	2415	28110
	270 - 314	2883	2271	1485	2658	4879	4987	20730	14107	54000
	315 - 359	13992	4081	1943	2002	2080	1868	12958	54018	93789
	COLUMN TOTALS:	48768	25746	18771	24382	59565	28724	53890	93791	353637
	BIASES:	0.99	1.00	1.01	1.00	1.01	1.00	1.00	0.99	

PERCENT CORRECT: 45.3230
 HEIDKE SKILL SCORE: 0.34896
 CHI SCORE: 11.89

CASES = 353637

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS
	0 - 100	130	371	48	71	25	207	1159
	200 - 400	274	5585	2112	489	171	1192	10455
	500 - 900	178	3011	5309	2187	460	1018	12933
GEM	1000 - 2900	93	1000	2974	16828	4001	4017	29517
	3000 - 6000	44	466	374	6017	40702	16070	64160
	CLR BELOW 6001	326	1039	869	4580	19884	200678	228867
	X/-X	141	1258	615	423	322	1060	6526
	COLUMN TOTALS:	1186	12730	12301	30595	65565	124242	353637
	BIASES:	0.98	0.82	1.05	0.96	0.98	1.02	0.93

PERCENT CORRECT: 76.8978

HEIDKE SKILL SCORE: 0.57691

CHI SCORE: 636.78

THREAT SCORE: 0.33177

CASES = 353637

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS
	0 - 100	130	374	48	71	25	209	1164
	200 - 400	305	6297	2667	943	242	1596	12772
	500 - 900	168	2466	4958	2273	528	924	11963
PERSISTENCE	1000 - 2900	102	903	2857	17138	4845	4270	30668
	3000 - 6000	19	366	236	5235	40668	17625	64601
	CLR BELOW 6001	321	1011	850	4441	18808	198269	225078
	X/-X	141	1313	685	494	449	1349	7391
	COLUMN TOTALS:	1186	12730	12301	30595	65565	224242	353637
	BIASES:	0.98	1.00	0.97	1.00	0.99	1.00	1.05

PERCENT CORRECT: 76.4682

HEIDKE SKILL SCORE: 0.57331

CHI SCORE: 47.12

THREAT SCORE: 0.34252

CASES = 353637

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS	
GEM	0 - 100	93	63	60	74	2	770	1062
	200 - 400	254	395	255	129	102	721	1856
	500 - 900	43	200	801	845	123	1638	3650
	1000 - 2900	151	246	1163	4780	1961	6255	14556
	3000 - 6000	23	39	148	1831	23675	31974	57690
	CLR BELOW 6001	521	875	1761	5819	17352	248495	274823
	COLUMN TOTALS:	1085	1818	4188	13478	43215	289853	353637
BIASES:	0.98	1.02	0.87	1.08	1.33	0.95		

PERCENT CORRECT: 78.6793
HEIDKE SKILL SCORE: 0.37544
CHI SCORE: 5784.43
THREAT SCORE: 0.16049

CASES = 353637

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS	
PERSISTENCE	0 - 100	102	115	92	94	6	793	1202
	200 - 400	256	394	256	130	102	725	1863
	500 - 900	43	145	879	1119	154	1800	4140
	1000 - 2900	142	238	1002	4341	1936	5831	13490
	3000 - 6000	24	39	148	1632	19507	21183	42533
	CLR BELOW 6001	518	887	1811	6162	21510	259521	290409
COLUMN TOTALS:	1085	1818	4188	13478	43215	289853	353637	
BIASES:	1.11	1.02	0.99	1.00	0.98	1.00		

PERCENT CORRECT: 80.5197
HEIDKE SKILL SCORE: 0.37275
CHI SCORE: 26.12
THREAT SCORE: 0.16997

CASES = 353637

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	0	0	0	0	0	0	0
200 - 400	0	0	0	0	0	0	0
500 - 900	1	0	6	1	0	50	58
GEM 1000 - 2900	0	22	62	188	236	1241	1749
3000 - 6000	1	166	409	372	3629	13546	18123
CLR BELOW 6001	53	466	1942	2288	11766	317192	333707
COLUMN TOTALS:	55	654	2419	2849	15631	332029	353637
BIASES:	0.00	0.00	0.02	0.61	1.16	1.01	

PERCENT CORRECT: 90.7753

HEIDKE SKILL SCORE: 0.17422

CHI SCORE: 3843.87

THREAT SCORE: 0.00000

CASES = 353637

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	0	0	1	4	1	47	53
200 - 400	0	9	15	33	94	517	668
500 - 900	4	14	187	51	369	1792	2417
PERSISTENCE 1000 - 2900	13	47	192	284	361	1901	2798
3000 - 6000	3	86	341	371	3029	11650	15480
CLR BELOW 6001	35	498	1683	2106	11777	316122	332221
COLUMN TOTALS:	55	654	2419	2849	15631	332029	353637
BIASES:	0.96	1.02	1.00	0.98	0.99	1.00	

PERCENT CORRECT: 90.3839

HEIDKE SKILL SCORE: 0.17040

CHI SCORE: 2.86

THREAT SCORE: 0.00633

CASES = 353637

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	199012	23959	2465	2041	227477
	SCT	22287	38964	10154	11516	82921
GEM	BKN	116	1085	694	1408	3303
	OVC	2188	8272	6406	23070	39936
	COLUMN TOTALS:	223603	72280	19719	38035	353637
	BIASES:	1.02	1.15	0.17	1.05	

PERCENT CORRECT: 74.0137
HEIDKE SKILL SCORE: 0.51216
CHI SCORE: 15394.95

CASES = 353637

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	197123	22810	2426	1966	224325
	SCT	21820	34423	7412	7932	71587
PERSISTENCE	BKN	2480	7361	4009	5940	19790
	OVC	2180	7686	5872	22197	37935
	COLUMN TOTALS:	223603	72280	19719	38035	353637
	BIASES:	1.00	0.99	1.00	1.00	

PERCENT CORRECT: 72.8860
HEIDKE SKILL SCORE: 0.50055
CHI SCORE: 9.49

CASES = 353637

CLOUD COVER TWO

VERIFYING OBSERVATION

		CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
GEM	CLR BELOW 6001	263348	16044	8419	6780	294591
	SCT	14760	7437	4747	2574	29518
	BKN	4601	2195	2673	1850	11319
	OVC	8974	2060	3176	3999	18209
	COLUMN TOTALS:	291683	27736	19015	15203	353637
	BIASES:	1.01	1.06	0.60	1.20	

PERCENT CORRECT: 78.4581
HEIDKE SKILL SCORE: 0.28770
CHI SCORE: 3852.67

CASES = 353637

CLOUD COVER TWO

VERIFYING OBSERVATION

		CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
PERSISTENCE	CLR BELOW 6001	261488	15214	8526	7045	292273
	SCT	14955	6697	3707	1926	27285
	BKN	8212	4030	4115	2691	19048
	OVC	7028	1795	2667	3541	15031
	COLUMN TOTALS:	291683	27736	19015	15203	353637
	BIASES:	1.00	0.98	1.00	0.99	

PERCENT CORRECT: 78.0012
HEIDKE SKILL SCORE: 0.28468
CHI SCORE: 10.53

CASES = 353637

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
GEM	CLR BELOW 6001	313974	5873	6661	6192	332700
	SCT	1509	237	205	116	2067
	BKN	6071	661	1139	834	8705
	OVC	6437	675	1093	1960	10165
	COLUMN TOTALS:	327991	7446	9098	9102	353637
	BIASES:	1.01	0.28	0.96	1.12	

PERCENT CORRECT: 89.7276
HEIDKE SKILL SCORE: 0.18431
CHI SCORE: 4094.53

CASES = 353637

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
PERSISTENCE	CLR BELOW 6001	310459	5388	6324	6048	328219
	SCT	5614	754	816	336	7320
	BKN	6132	743	1205	933	9013
	OVC	5786	561	953	1785	9085
	COLUMN TOTALS:	327991	7446	9098	9102	353637
	BIASES:	1.00	0.98	0.99	1.00	

PERCENT CORRECT: 88.8490
HEIDKE SKILL SCORE: 0.18861
CHI SCORE: 3.12

CASES = 353637

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
	0 < 1/2	295	210	327	258	119	1322
	1/2 < 1	201	629	514	273	75	1833
GEM	1 < 3	271	707	6909	4746	1331	15887
	3 < 5	259	367	6524	14655	6598	34936
	5 < 7	74	93	1509	8524	12163	31591
	7 +	37	116	1205	4325	13297	268068
COLUMN TOTALS:	1137	2122	16968	32781	33583	267026	353637
BIASES:	1.16	0.86	0.94	1.07	0.94	1.00	

PERCENT CORRECT: 80.2345

HEIDKE SKILL SCORE: 0.51529

CHI SCORE: 404.71

THREAT SCORE: 0.26285

CASES = 353637

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
	0 < 1/2	318	228	347	270	134	1415
	1/2 < 1	219	665	620	365	128	2191
PERSISTENCE	1 < 3	237	688	7215	5196	1478	17027
	3 < 5	250	322	6079	14070	6198	33054
	5 < 7	80	108	1555	8674	12879	33867
	7 +	33	111	1172	4206	12766	266083
COLUMN TOTALS:	1137	2122	16988	32781	33583	267026	353637
BIASES:	1.24	1.03	1.00	1.01	1.01	1.00	

PERCENT CORRECT: 80.0092

HEIDKE SKILL SCORE: 0.51448

CHI SCORE: 78.31

THREAT SCORE: 0.26311

CASES = 353637

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS
GEM						
0 - 10	303680	15019	3070	76	12	321857
11 - 20	10282	7261	2817	91	0	20451
21 - 30	2849	3037	4631	767	15	11299
31 - 40	8	0	0	22	0	30
41 +	0	0	0	0	0	0
COLUMN TOTALS:	316819	25317	10518	956	27	353637
BIASES:	1.02	0.81	1.07	0.03	0.00	

PERCENT CORRECT: 89.2424

HEIDKE SKILL SCORE: 0.40079

CHI SCORE: 1997.31

CASES = 353637

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS
PERSISTENCE						
0 - 10	300353	13927	3137	96	12	317525
11 - 20	13609	8351	2741	68	0	24769
21 - 30	2775	2989	4145	509	7	10425
31 - 40	74	50	495	264	8	891
41 +	8	0	0	19	0	27
COLUMN TOTALS:	316819	25317	10518	956	27	353637
BIASES:	1.00	0.98	0.99	0.93	1.00	

PERCENT CORRECT: 88.5408

HEIDKE SKILL SCORE: 0.39593

CHI SCORE: 18.68

CASES = 353637

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	121	419	70	51	10	292	963
200 - 400	459	5681	2261	950	111	1248	10710
500 - 900	107	1990	3918	1595	193	1404	9207
GEM 1000 - 2900	47	718	2538	12373	2751	4693	23120
3000 - 6000	0	117	142	2403	26047	14006	42715
CLR BELOW 6001	253	809	868	4126	13570	247296	266922
COLUMN TOTALS:	987	9734	9797	21498	42682	268939	353637
BIASES:	0.98	1.10	0.94	1.08	1.00	0.99	

PERCENT CORRECT: 83.5422
HEIDKE SKILL SCORE: 0.5945
CHI SCORE: 271.51
THREAT SCORE: 0.42510

CASES = 353637

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	98	467	114	38	13	335	1065
200 - 400	418	5246	2064	913	96	1050	9787
500 - 900	133	2161	4013	1666	186	1480	9639
PERSISTENCE 1000 - 2900	46	720	2473	11675	2328	4355	21597
3000 - 6000	0	172	202	2969	25417	13587	42347
CLR BELOW 6001	292	968	931	4237	14642	248132	269202
COLUMN TOTALS:	987	9734	9797	21498	42682	268939	353637
BIASES:	1.08	1.01	0.98	1.00	0.99	1.00	

PERCENT CORRECT: 83.3004
HEIDKE SKILL SCORE: 0.58396
CHI SCORE: 12.34
THREAT SCORE: 49596

CASES = 353637

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	199455	19744	4754	4193	228146
	SCT	18533	16483	7687	11014	53717
GEM	BKN	1127	1621	1396	2113	6257
	OVC	4488	7488	8521	45020	65517
	COLUMN TOTALS:	223603	45336	22358	62340	353637
	BIASES:	1.02	1.18	0.28	1.05	

PERCENT CORRECT: 74.1874
HEIDKE SKILL SCORE: 0.52095
CHI SCORE: 13398.61

CASES = 353637

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

	CLR BELOW					
	6001	SCT	BKN	OVC	ROW TOTALS	
	CLR BELOW 6001	197123	18697	4508	3997	224325
	SCT	18273	14039	5553	7012	44877
PERSISTENCE	BKN	4097	5925	4531	7831	22384
	OVC	4110	6675	7766	43500	62051
	COLUMN TOTALS:	223603	45336	22358	62340	353637
	BIASES:	1.00	0.99	1.00	1.00	

PERCENT CORRECT: 73.2935
HEIDKE SKILL SCORE: 0.51240
CHI SCORE: 8.35

CASES = 353637

GEM VS. PERSISTENCE 110 MINUTE PROJECTION

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTALS
GEM										
0 - 29.235	0	31	0	0	0	0	0	0	0	31
29.236 - 29.530	30	3272	606	0	0	0	0	0	0	3908
29.531 - 29.677	0	488	10956	1885	24	0	0	0	0	13353
29.678 - 29.825	0	34	1943	34019	6169	0	0	0	0	42165
29.826 - 29.973	0	0	0	6345	75612	7047	0	0	0	89004
29.974 - 30.120	0	0	0	0	7476	80277	6421	0	0	94174
30.121 - 30.268	0	0	0	0	0	6743	67809	3662	0	78214
30.269 - 30.563	0	0	0	0	0	0	3447	32692	307	36446
30.564 +	0	0	0	0	0	0	0	223	1762	1985
COLUMN TOTALS:	30	3825	13505	42249	89281	94067	77677	36577	2069	359286
BIASES:	1.03	1.02	0.99	1.00	1.00	1.00	1.01	1.00	0.96	

PERCENT CORRECT: 85.2814

REIDKE SKILL SCORE: 0.81534

CHI SCORE: 12.29

NOTES = 059286

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTALS
PERSISTENCE										
0 - 29.235	0	31	0	0	0	0	0	0	0	31
29.236 - 29.530	30	3272	606	0	0	0	0	0	0	3908
29.531 - 29.677	0	488	10956	1885	24	0	0	0	0	13353
29.678 - 29.825	0	34	1943	34019	6169	0	0	0	0	42165
29.826 - 29.973	0	0	0	6345	75612	7047	0	0	0	89004
29.974 - 30.120	0	0	0	0	7476	80277	6421	0	0	94174
30.121 - 30.268	0	0	0	0	0	6743	67809	3662	0	78214
30.269 - 30.563	0	0	0	0	0	0	3447	32692	307	36446
30.564 +	0	0	0	0	0	0	0	223	1762	1985
COLUMN TOTALS:	30	3825	13505	42249	89281	94067	77677	36577	2069	359286
BIASES:	1.03	1.02	0.99	1.00	1.00	1.00	1.01	1.00	0.96	

PERCENT CORRECT: 85.2814

REIDKE SKILL SCORE: 0.81534

CHI SCORE: 12.29

NOTES = 059286

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 14	0	413	45	42	0	8	1	0	0	0	0	0	0	0	509
15 - 24	0	314	5531	3029	483	174	70	7	0	0	0	0	0	0	9608
25 - 34	0	16	3247	32681	6465	2271	816	375	74	3	0	0	0	0	45943
35 - 39	0	0	9	8610	19016	6509	1372	718	314	89	2	0	0	0	36639
40 - 44	0	0	0	1437	8843	15351	5452	1587	542	250	52	0	0	0	33514
45 - 49	0	0	0	167	1815	6871	11541	4756	1524	663	198	0	0	0	27535
50 - 54	0	0	0	6	323	1975	6496	12578	4608	1394	714	0	0	0	28094
55 - 59	0	0	0	0	20	286	1572	6001	10879	4243	2018	63	0	0	25082
60 - 64	0	0	0	0	2	83	489	1547	5054	11603	7773	426	0	0	26977
65 - 74	0	0	0	0	0	1	21	411	1759	8092	46601	11161	234	0	68280
75 - 84	0	0	0	0	0	0	0	0	38	174	9470	22211	6187	0	38080
85 - 94	0	0	0	0	0	0	0	0	0	0	446	5061	11514	744	17765
95 +	0	0	0	0	0	0	0	0	0	0	1	59	573	616	1249
COLUMN TOTALS	0	743	8832	45972	36967	33529	27820	27960	24792	26511	67275	38981	18508	1360	359280
BIASES	99.99	0.69	1.09	1.00	0.99	1.00	0.99	1.00	1.01	1.02	1.01	0.98	0.96	0.92	

PERCENT CORRECT: 85.8156
 HEIDKE SKILL SCORE: 0.50452
 CHI SCORE: 234.71

BASES = 359280

TEMPERATURE (DEGREES FAHRENHEIT)

		VERIFYING OBSERVATION												95 + ROW TOTALS	
		< 5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	
	< 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5 - 14	0	413	45	42	0	8	1	0	0	0	0	0	0	509
	15 - 24	0	314	5531	3029	483	174	70	7	0	0	0	0	0	9608
	25 - 34	0	16	3247	32681	6465	2271	816	375	74	3	0	0	0	45948
	35 - 39	0	0	9	8610	19016	6509	1372	718	314	89	2	0	0	36639
PERSISTENCE	40 - 44	0	0	0	1437	8843	15351	5452	1587	542	250	52	0	0	33514
	45 - 49	0	0	0	167	1815	6871	11541	4756	1524	663	198	0	0	27535
	50 - 54	0	0	0	6	323	1975	6496	12578	4608	1394	714	0	0	28094
	55 - 59	0	0	0	0	20	286	1572	6001	10879	4243	2018	63	0	25082
	60 - 64	0	0	0	0	2	83	-89	1547	5054	11603	7773	426	0	26977
	65 - 74	0	0	0	0	0	1	21	411	1759	8092	46601	11161	234	68280
	75 - 84	0	0	0	0	0	0	0	0	38	174	9470	22211	6187	38080
	85 - 94	0	0	0	0	0	0	0	0	0	0	446	5061	11514	17765
	95 +	0	0	0	0	0	0	0	0	0	0	1	59	573	1249
COLUMN TOTALS:		0	743	8832	45972	36967	33529	27830	27980	24792	26511	67275	38981	18508	359280
BIASES:		99.99	0.69	1.09	1.00	0.99	1.00	0.99	1.00	1.01	1.02	1.01	0.98	0.96	0.92

PERCENT CORRECT: 55.8158
HEIDKE SKILL SCORE: 0.50452
CHI SCORE: 234.71

CASES = 359280

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS	
GEM	0 - 1	8752	9947	2622	147	0	21468
	2 - 7	11643	101393	21102	1618	8	135764
	8 - 15	475	22637	85345	18349	323	127129
	16 - 25	7	1047	16380	38337	5656	61427
	26 +	0	2	481	4295	8714	13492
COLUMN TOTALS:		20877	135026	125930	62746	14701	359280
BIASES:		1.03	1.01	1.01	0.98	0.92	

PERCENT CORRECT: 67.5075

HEIDKE SKILL SCORE: 0.53522

CHI SCORE: 159.33

CASES = 359280

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS	
	0 - 1	8752	9907	2621	147	0	21427
	2 - 7	11643	101431	21103	1618	8	135803
PERSISTENCE	8 - 15	475	22639	85345	18349	323	127131
	16 - 25	7	1047	16380	38337	5656	61427
	26 +	0	2	481	4295	8714	13492
COLUMN TOTALS:	20877	135026	125930	62746	14701		359280
BIASES:	1.03	1.01	1.01	0.98	0.92		

PERCENT CORRECT: 67.5181

HEIDKE SKILL SCORE: 0.53535

CHI SCORE: 157.57

CASES = 359280

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS	
GEM	0 - 1	3262	8777	142	1	0	12182
	2 - 9	12491	264721	21564	140	0	298916
	10 - 19	24	17607	28354	1298	2	47285
	20 - 29	0	48	486	361	2	897
	30 +	0	0	0	0	0	0
COLUMN TOTALS:		15777	291153	50546	1800	4	359280
BIASES:		0.77	1.03	0.94	0.50	0.00	

PERCENT CORRECT: 82.5813
HEIDKE SKILL SCORE: 0.43031
CHI SCORE: 1693.54

CASES = 359280

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS	
PERSISTENCE	0 - 1	3663	12047	172	1	0	15883
	2 - 9	12081	258871	20899	144	0	291995
	10 - 19	33	20141	28417	1133	2	49726
	20 - 29	0	94	1058	518	2	1672
	30 +	0	0	0	4	0	4
COLUMN TOTALS:		15777	291153	50546	1800	4	359280
BIASES:		1.01	1.00	0.98	0.93	1.00	

PERCENT CORRECT: 81.1259
HEIDKE SKILL SCORE: 0.41009
CHI SCORE: 25.55

CASES = 359280

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
GEM	0 - 44	21323	6920	2191	1128	940	594	3153	49060
	45 - 89	6570	7992	3270	1295	809	458	2329	26166
	90 - 134	1590	2725	5785	3133	1626	654	2019	19274
	135 - 179	769	852	2254	6677	6836	1436	3003	24101
	180 - 224	1081	631	1424	6322	34155	10385	4921	61865
	225 - 269	770	414	667	1393	8690	8352	5568	28420
	270 - 314	3252	2330	1610	2717	5137	5295	20614	56905
	315 - 359	14170	4293	1931	2125	2184	2066	12992	93489
COLUMN TOTALS:		49525	26157	19132	24790	60377	29240	54599	95460
BIASES:		0.99	1.00	1.01	0.97	1.02	0.97	1.04	0.98

PERCENT CORRECT: 44.1511
HEIDKE SKILL SCORE: 0.33498
CHI SCORE: 222.33

CASES = 359280

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS
PERSISTENCE	0 - 44	21335	6920	2191	1128	945	596	3153	49095
	45 - 89	6572	7992	3270	1297	816	459	2329	26180
	90 - 134	1590	2725	5794	3133	1627	654	2019	19285
	135 - 179	769	855	2264	7105	6949	1442	3004	24662
	180 - 224	1081	628	1414	5894	34032	10378	4920	61292
	225 - 269	785	431	673	1416	8892	8732	5653	29252
	270 - 314	3207	2313	1595	2692	4932	4913	20420	54997
	315 - 359	14186	4293	1931	2125	2184	2066	13101	94517
COLUMN TOTALS:		49525	26157	19132	24790	60377	29240	54599	95460
BIASES:		0.99	1.00	1.01	0.99	1.02	1.00	1.01	0.99

PERCENT CORRECT: 44.5449
HEIDKE SKILL SCORE: 0.33967
CHI SCORE: 31.73

CASES = 359280

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS
GEM								
0 - 100	107	367	76	67	27	194	304	1142
200 - 400	266	5321	2066	593	160	1020	675	10101
500 - 900	210	3224	5248	2271	498	1112	877	13440
1000 - 2900	106	1062	3076	16646	4207	4236	625	29958
3000 - 6000	34	487	410	6216	40459	16768	536	64910
CLR BELOW 6001	337	1125	1022	4867	21003	203180	1527	233061
X/-X	154	1332	614	459	342	1206	2561	6668
COLUMN TOTALS:	1214	12918	12512	31119	66696	227716	7105	359280
BIASES:	0.94	0.78	1.07	0.96	0.97	1.02	0.94	

PERCENT CORRECT: 76.1306
 HEIDKE SKILL SCORE: 0.56235
 CHI SCORE: 930.87
 THREAT SCORE: 0.31381

CASES = 359280

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS
PERSISTENCE								
0 - 100	107	371	76	71	27	196	304	1152
200 - 400	317	6152	2708	1073	293	1669	773	12985
500 - 900	173	2576	4807	2338	550	998	702	12144
1000 - 2900	120	975	2983	16956	5054	4523	606	31217
3000 - 6000	9	388	271	5473	40427	18596	473	65637
CLR BELOW 6001	328	1053	992	4677	19867	200276	1431	228624
X/-X	160	1403	675	531	478	1458	2816	7521
COLUMN TOTALS:	1214	12918	12512	31119	66696	227716	7105	359280
BIASES:	0.95	1.01	0.97	1.00	0.98	1.00	1.06	

PERCENT CORRECT: 75.5792
 HEIDKE SKILL SCORE: 0.55787
 CHI SCORE: 59.44
 THREAT SCORE: 0.32581

CASES = 359280

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	71	48	47	71	2	813	1052
200 - 400	240	373	277	165	98	725	1878
500 - 900	41	195	757	694	73	1700	3460
1000 - 2900	145	283	1258	4879	2009	6562	15136
3000 - 6000	24	41	175	1955	23349	33183	58727
CLR BELOW 6001	580	919	1775	5932	18365	251456	279027
COLUMN TOTALS:	1101	1859	4289	13696	43896	294439	359280
BIASES:	0.96	1.01	0.81	1.11	1.34	0.95	

PERCENT CORRECT: 78.1800
HEIDKE SKILL SCORE: 0.36162
CHI SCORE: 6131.63
THREAT SCORE: 0.14192

CASES = 359280

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	78	111	86	95	12	848	1230
200 - 400	242	373	278	168	99	733	1893
500 - 900	40	139	905	1116	164	1848	4212
1000 - 2900	138	251	1009	4272	1999	6029	13698
3000 - 6000	25	40	178	1758	19099	22098	43198
CLR BELOW 6001	578	945	1833	6287	22523	262883	295049
COLUMN TOTALS:	1101	1859	4289	13696	43896	294439	359280
BIASES:	1.12	1.02	0.98	1.00	0.98	1.00	

PERCENT CORRECT: 80.0518
HEIDKE SKILL SCORE: 0.35789
CHI SCORE: 29.48
THREAT SCORE: 0.15230

CASES = 359280

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
GEM							
0 - 100	0	0	0	0	0	0	0
200 - 400	0	0	0	0	0	0	0
500 - 900	0	0	3	1	1	10	15
1000 - 2900	0	12	44	102	163	839	1160
3000 - 6000	1	188	422	375	3553	13941	18480
CLR BELOW 6001	54	466	1974	2422	12150	322559	339625
COLUMN TOTALS:	55	666	2443	2900	15867	337349	359280
BIASES:	0.00	0.00	0.01	0.40	1.16	1.01	

PERCENT CORRECT: 90.7974
HEIDKE SKILL SCORE: 0.16424
CHI SCORE: 4623.76
THREAT SCORE: 0.00000

CASES = 359280

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
PERSISTENCE							
0 - 100	0	1	1	2	5	49	58
200 - 400	0	17	12	30	84	525	668
500 - 900	3	23	182	42	325	1873	2448
1000 - 2900	16	43	159	270	380	1956	2824
3000 - 6000	5	93	371	363	2863	12021	15716
CLR BELOW 6001	31	489	1718	2193	12210	320925	337566
COLUMN TOTALS:	55	666	2443	2900	15867	337349	359280
BIASES:	1.05	1.00	1.00	0.97	0.99	1.00	

PERCENT CORRECT: 90.2519
HEIDKE SKILL SCORE: 0.15779
CHI SCORE: 3.75
THREAT SCORE: 0.01260

CASES = 359280

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
CLR BELOW 6001	201848	25360	2700	2385	232293
SCT	22862	39079	10607	12875	85423
BKN	149	989	783	1210	3131
OVC	2182	8026	6011	22214	38433
COLUMN TOTALS:	227041	73454	20101	38684	359280
BIASES:	1.02	1.16	0.16	0.99	

PERCENT CORRECT: 73.4591
HEIDKE SKILL SCORE: 0.49999
CHI SCORE: 16400.11

CASES = 359280

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
CLR BELOW 6001	199098	23932	2586	2249	227865
SCT	22758	33968	7717	8295	72738
BKN	2748	7408	3922	5995	20073
OVC	2437	8146	5876	22145	38604
COLUMN TOTALS:	227041	73454	20101	38684	359280
BIASES:	1.00	0.99	1.00	1.00	

PERCENT CORRECT: 72.1256
HEIDKE SKILL SCORE: 0.48678
CHI SCORE: 10.17

CASES = 359280

CLOUD COVER TWO

VERIFYING OBSERVATION

		CLR BELOW				ROW TOTALS
		6001	SCT	BKN	OVC	
GEM	CLR BELOW 6001	265942	16438	8747	7011	298138
	SCT	16033	7405	4943	2657	31038
	BKN	4399	2115	2340	1716	10570
	OVC	9926	2209	3316	4083	19534
COLUMN TOTALS:		296300	28167	19346	15467	359280
BIASES:		1.01	1.10	0.55	1.26	

PERCENT CORRECT: 77.8696
HEIDKE SKILL SCORE: 0.27428
CHI SCORE: 5354.53

CASES = 359280

CLOUD COVER TWO

VERIFYING OBSERVATION

		CLR BELOW				ROW TOTALS
		6001	SCT	BKN	OVC	
PERSISTENCE	CLR BELOW 6001	264912	15881	8839	7330	296962
	SCT	15542	6584	3687	1895	27708
	BKN	8599	3866	4139	2717	19321
	OVC	7247	1836	2681	3525	15289
COLUMN TOTALS:		296300	28167	19346	15467	359280
BIASES:		1.00	0.98	1.00	0.99	

PERCENT CORRECT: 77.6998
HEIDKE SKILL SCORE: 0.27495
CHI SCORE: 11.04

CASES = 359280

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW	6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	319401	6148	7095	6371	339015
GEM	SCT	1710	174	274	182	2340
	BKN	4470	496	653	526	6145
	OVC	7648	745	1228	2159	11780
	COLUMN TOTALS:	333229	7563	9250	9238	359280
	BIASES:	1.02	0.31	0.66	1.28	

PERCENT CORRECT: 89.7314
HEIDKE SKILL SCORE: 0.16788
CHI SCORE: 5449.21

CASES = 359280

CLOUD COVER THREE

VERIFYING OBSERVATION

	CLR BELOW	6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	315151	5522	6608	6197	333478
PERSISTENCE	SCT	5683	789	644	344	7460
	BKN	6439	731	1044	918	9132
	OVC	5956	521	954	1779	9210
	COLUMN TOTALS:	333229	7563	9250	9238	359280
	BIASES:	1.00	0.99	0.99	1.00	

PERCENT CORRECT: 88.7227
HEIDKE SKILL SCORE: 0.17904
CHI SCORE: 3.18

CASES = 359280

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
GEM	0 < 1/2	275	182	306	275	175	1339
	1/2 < 1	186	592	565	280	92	1874
	1 < 3	255	697	6760	4740	1383	16073
	3 < 5	289	412	6694	14683	6770	36377
	5 < 7	99	122	1570	8534	11579	31384
	7 +	38	122	1387	4765	14197	272233
COLUMN TOTALS:		1142	2127	17282	33277	34196	271256
BIASES:		1.17	0.88	0.93	1.09	0.92	1.00

PERCENT CORRECT: 79.4959

HEIDKE SKILL SCORE: 0.49749

CHI SCORE: 672.20

THREAT SCORE: 0.23537

CASES = 359260

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
PERSISTENCE	0 < 1/2	290	195	329	291	187	1427
	1/2 < 1	194	643	643	375	146	2241
	1 < 3	261	671	7095	5182	1526	17273
	3 < 5	259	361	6183	13839	6224	33672
	5 < 7	103	137	1688	8909	12404	34361
	7 +	35	120	1344	4681	13709	270306
COLUMN TOTALS:		1142	2127	17282	33277	34196	271256
BIASES:		1.17	0.88	0.93	1.09	0.92	1.00

PERCENT CORRECT: 79.2385

HEIDKE SKILL SCORE: 0.49587

CHI SCORE: 86.05

THREAT SCORE: 0.23544

CASES = 359280

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS
GEM	0 - 10	307985	15431	3150	99	9 326674
	11 - 20	10908	7108	3088	104	0 21208
	21 - 30	2931	3163	4428	735	19 11276
	31 - 40	25	9	61	27	0 122
	41 +	0	0	0	0	0 0
COLUMN TOTALS:		321849	25711	10727	965	28 359280
BIASES:		1.01	0.82	1.05	0.13	0.00

PERCENT CORRECT: 88.9412
HEIDKE SKILL SCORE: 0.38671
CHI SCORE: 1653.51

CASES = 359280

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS
PERSISTENCE	0 - 10	304720	14426	3281	134	9 322570
	11 - 20	14175	8089	2861	71	0 25196
	21 - 30	2880	3134	4076	487	6 10583
	31 - 40	65	62	503	261	13 904
	41 +	9	0	6	12	0 27
COLUMN TOTALS:		321849	25711	10727	965	28 359280
BIASES:		1.00	0.98	0.99	0.94	0.96

PERCENT CORRECT: 88.2727
HEIDKE SKILL SCORE: 0.38215
CHI SCORE: 17.76

CASES = 359280

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	79	344	74	61	16	336	910
200 - 400	470	5616	2359	1074	121	1424	11064
500 - 900	124	2111	3785	1626	207	1499	9352
GEM 1000 - 2900	42	764	2662	12111	2833	4970	23382
3000 - 6000	0	117	164	2580	26275	15548	44684
CLR BELOW 6001	287	942	940	4396	13976	249347	269888
COLUMN TOTALS:	1002	9894	9984	21848	43428	273124	359280
BIASES:	0.91	1.12	0.94	1.07	1.03	0.99	

PERCENT CORRECT: 82.7246
HEIDKE SKILL SCORE: 0.57697
CHI SCORE: 369.18
THREAT SCORE: 0.39784

CASES = 359280

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	89	465	138	51	15	311	1069
200 - 400	427	5108	2124	974	116	1208	9957
500 - 900	151	2288	3853	1725	186	1594	9797
PERSISTENCE 1000 - 2900	43	767	2619	11516	2423	4583	21951
3000 - 6000	1	200	208	3159	25284	14187	43039
CLR BELOW 6001	291	1066	1042	4423	15404	251241	273467
COLUMN TOTALS:	1002	9894	9984	21848	43428	273124	359280
BIASES:	1.07	1.01	0.98	1.00	0.99	1.00	

PERCENT CORRECT: 92.6907
HEIDKE SKILL SCORE: 0.56904
CHI SCORE: 12.78
THREAT SCORE: 0.38458

CASES = 359280

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

		CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	202242	20860	5353	4787	233242
	SCT	18800	16084	7844	11699	54427
GEM	BKN	1130	1311	1105	1819	5365
	OVC	4869	7828	8465	45084	66246
	COLUMN TOTALS:	227041	46083	22767	63389	359280
	BIASES:	1.03	1.18	0.24	1.05	

PERCENT CORRECT: 73.6236
HEIDKE SKILL SCORE: 0.50868
CHI SCORE: 15110.19

CASES = 359280

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

		CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	199098	19360	4926	4481	227865
	SCT	18905	13878	5618	7201	45602
PERSISTENCE	BKN	4515	5794	4433	7968	22710
	OVC	4523	7051	7790	43739	63103
	COLUMN TOTALS:	227041	46083	22767	63389	359280
	BIASES:	1.00	0.99	1.00	1.00	

PERCENT CORRECT: 72.6865
HEIDKE SKILL SCORE: 0.50152
CHI SCORE: 9.44

CASES = 359280

GEM VS. PERSISTENCE 120 MINUTE PROJECTION

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTALS
GEM										
0 - 29.235	0	32	0	0	0	0	0	0	0	32
29.236 - 29.530	32	3323	683	0	0	0	0	0	0	4038
29.531 - 29.677	0	539	11150	2100	35	0	0	0	0	13824
29.678 - 29.825	0	53	2164	34652	6770	0	0	0	0	43639
29.826 - 29.973	0	0	0	6990	77218	7826	0	0	0	92034
29.974 - 30.120	0	0	0	0	8346	81888	7164	0	0	97398
30.121 - 30.268	0	0	0	0	0	7514	69361	4052	0	80927
30.269 - 30.563	0	0	0	0	0	0	3793	33487	348	37628
30.564 +	0	0	0	0	0	0	0	251	1791	2042
COLUMN TOTALS:	32	3947	13997	43742	92369	97228	80318	37790	2139	371562
BIASES:	1.00	1.02	0.99	1.00	1.00	1.00	1.01	1.00	0.95	

PERCENT CORRECT: 84.2040
 HEIGHT SKILL SCORE: 0.90183
 CHI SCORE: 15.70

BASED ON: 371562

PRESSURE (INCHES)

VERIFYING OBSERVATION

	0- 29.235	29.236- 29.530	29.531- 29.677	29.678- 29.825	29.826- 29.973	29.974- 30.120	30.121- 30.268	30.269- 30.563	30.564 +	ROW TOTALS
PERSISTENCE										
0 - 29.235	0	32	0	0	0	0	0	0	0	32
29.236 - 29.530	32	3323	683	0	0	0	0	0	0	4038
29.531 - 29.677	0	539	11150	2100	35	0	0	0	0	13824
29.678 - 29.825	0	53	2164	34652	6770	0	0	0	0	43639
29.826 - 29.973	0	0	0	6990	77218	7826	0	0	0	92034
29.974 - 30.120	0	0	0	0	8346	81888	7164	0	0	97398
30.121 - 30.268	0	0	0	0	0	7514	69361	4052	0	80927
30.269 - 30.563	0	0	0	0	0	0	3793	33487	348	37628
30.564 +	0	0	0	0	0	0	0	251	1791	2042
COLUMN TOTALS:	32	3947	13997	43742	92369	97228	80318	37790	2139	371562
BIASES:	1.00	1.02	0.99	1.00	1.00	1.00	1.01	1.00	0.95	

PERCENT CORRECT: 84.2040
 HEIGHT SKILL SCORE: 0.90183
 CHI SCORE: 15.70

BASED ON: 371562

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
JEH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 14	0	406	45	47	3	7	3	0	0	0	0	0	0	0	511
15 - 24	0	328	5556	3112	588	225	86	23	0	0	0	0	0	0	9920
25 - 34	0	24	3505	33093	6691	2548	981	481	120	19	0	0	0	0	47462
35 - 39	0	0	9	9192	19001	6838	1522	789	492	133	18	0	0	0	37904
40 - 44	0	0	0	1746	9365	15202	5555	1799	625	314	83	0	0	0	34689
45 - 49	0	0	0	263	2141	7060	11391	4841	1670	754	306	0	0	0	28426
50 - 54	0	0	0	11	459	2292	6751	12470	4695	1542	869	4	0	0	29093
55 - 59	0	0	0	0	39	422	1747	6255	10696	4411	2223	119	0	0	25912
60 - 64	0	0	0	0	3	120	626	1722	5244	11301	8261	646	0	0	27923
65 - 74	0	0	0	0	0	0	54	542	2123	8729	46733	12239	335	0	70755
75 - 84	0	0	0	0	0	0	0	1	49	228	10486	21690	6858	0	39312
85 - 94	0	0	0	0	0	0	0	0	0	0	600	5563	11401	807	18371
95 +	0	0	0	0	0	0	0	0	0	0	5	71	606	602	1284
COLUMN TOTALS:	0	758	9115	47464	38290	34714	28718	28923	25624	27431	69584	40332	19200	1409	371562
BIASES:	99.99	0.67	1.09	1.00	0.99	1.00	0.99	1.01	1.01	1.02	1.02	0.97	0.96	0.91	

PERCENT CORRECT: 53.7036
 HEIDKE SKILL SCORE: 0.48081
 CHI SCORE: 263.91
 CASES = 371562

TEMPERATURE (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	< 5	5-14	15-24	25-34	35-39	40-44	45-49	50-54	55-59	60-64	65-74	75-84	85-94	95 +	ROW TOTALS
< 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 14	0	406	45	47	3	7	3	0	0	0	0	0	0	0	511
15 - 24	0	328	5556	3112	588	225	88	23	0	0	0	0	0	0	9910
25 - 34	0	24	3505	33093	6691	2548	991	481	120	19	0	0	0	0	47462
35 - 39	0	0	9	9192	19001	6838	1522	789	402	135	18	0	0	0	37904
PERSISTENCE 40 - 44	0	0	0	1746	9365	15202	5555	1799	625	314	83	0	0	0	34689
45 - 49	0	0	0	263	2141	7060	11391	4841	1670	754	306	0	0	0	28426
50 - 54	0	0	0	11	459	2292	6751	12470	4695	1542	869	4	0	0	29093
55 - 59	0	0	0	0	39	422	1747	6255	10696	4411	2223	119	0	0	25912
60 - 64	0	0	0	0	3	120	626	1722	5244	11301	8261	848	0	0	27923
65 - 74	0	0	0	0	0	0	54	542	2123	8729	46733	12239	335	0	30755
75 - 84	0	0	0	0	0	0	0	1	49	228	13486	41890	8452	0	39012
85 - 94	0	0	0	0	0	0	0	0	0	0	600	5563	11401	807	18371
95 +	0	0	0	0	0	0	0	0	0	0	5	71	606	604	1264
COLUMN TOTALS:	0	758	9115	47464	38290	34714	28718	28923	25624	27431	69584	40332	19200	1409	371562
BIASES:	99.99	0.67	1.09	1.00	0.99	1.00	0.99	1.01	1.01	1.02	1.02	0.97	0.96	0.91	

PERCENT CORRECT: 53.7036
 HEIDKE SKILL SCORE: 0.48081
 CHI SCORE: 263.91

CASES = 371562

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS	
GEM	0 - 1	7942	10896	3121	236	0	22195
	2 - 7	13028	102884	22567	2077	19	140575
	8 - 15	545	24487	86237	19720	428	131417
	16 - 25	14	1388	17577	38216	6184	63379
	26 +	0	8	665	4650	8673	13996
COLUMN TOTALS:		21529	139663	130167	64899	15304	371562
BIASES:		1.03	1.01	1.01	0.98	0.91	

PERCENT CORRECT: 65.6558
HEIDKE SKILL SCORE: 0.50872
CHI SCORE: 185.95

CASES = 371562

DEW POINT DEPRESSION (DEGREES FAHRENHEIT)

VERIFYING OBSERVATION

	0-1	2-7	8-15	16-25	26 +	ROW TOTALS	
PERSISTENCE	0 - 1	7946	10889	3117	236	0	22188
	2 - 7	13019	102849	22503	2077	19	140467
	8 - 15	550	24529	86305	19720	428	131532
	16 - 25	14	1388	17577	38216	6184	63379
	26 +	0	8	665	4650	8673	13996
COLUMN TOTALS:		21529	139663	130167	64899	15304	371562
BIASES:		1.03	1.01	1.01	0.98	0.91	

PERCENT CORRECT: 65.6658
HEIDKE SKILL SCORE: 0.50887
CHI SCORE: 186.51

CASES = 371562

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
GEM						
0 - 1	3236	8856	163	1	0	12256
2 - 9	13040	273984	23153	152	0	310329
10 - 19	22	18186	28563	1363	3	48137
20 - 29	0	47	440	352	1	840
30 +	0	0	0	0	0	0
COLUMN TOTALS:	16298	301073	52319	1868	4	371562
BIASES:	0.75	1.03	0.92	0.45	0.00	

PERCENT CORRECT: 82.3914
HEIDKE SKILL SCORE: 0.41990
CHI SCORE: 2191.01

CASES = 371562

WIND SPEED (KTS)

VERIFYING OBSERVATION

	0-1	2-9	10-19	20-29	30 +	ROW TOTALS
PERSISTENCE						
0 - 1	3712	12483	215	1	0	16411
2 - 9	12557	267060	22277	153	0	302047
10 - 19	29	21424	28750	1170	3	51376
20 - 29	0	106	1076	541	1	1724
30 +	0	0	1	3	0	4
COLUMN TOTALS:	16298	301073	52319	1868	4	371562
BIASES:	1.01	1.00	0.98	0.92	1.00	

PERCENT CORRECT: 80.7572
HEIDKE SKILL SCORE: 0.39843
CHI SCORE: 32.03

CASES = 371562

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS	
GEM	0 - 44	21426	7142	2207	1260	1038	660	3428	13455	50616
	45 - 89	6727	8090	3393	1393	893	529	2434	3571	27030
	90 - 134	1716	2819	5881	3204	1693	669	2070	1863	19915
	135 - 179	889	889	2246	6725	7187	1483	3133	2328	24880
	180 - 224	1162	698	1547	6470	34928	10802	5197	3223	64027
	225 - 269	842	411	717	1522	8855	8349	5777	2781	29254
	270 - 314	3582	2519	1716	2841	5574	5624	20736	16989	59581
	315 - 359	14822	4485	2118	2158	2253	2154	13640	54629	96259
COLUMN TOTALS:	51166	27053	19825	25573	62421	30270	56415	98839	371562	
BIASES:	0.99	1.00	1.00	0.97	1.03	0.97	1.06	0.97		

PERCENT CORRECT: 43.2671

HEIDKE SKILL SCORE: 0.32449

CHI SCORE: 345.56

CASES = 371562

WIND DIRECTION (DEGS)

VERIFYING OBSERVATION

	0-44	45-89	90-134	135-179	180-224	225-269	270-314	315-359	ROW TOTALS	
PERSISTENCE	0 - 44	21469	7142	2207	1260	1045	660	3433	13476	50692
	45 - 89	6731	8090	3393	1396	903	529	2434	3576	27052
	90 - 134	1716	2819	5890	3204	1694	669	2070	1864	19926
	135 - 179	889	897	2251	7165	7320	1489	3133	2328	25472
	180 - 224	1162	690	1542	6033	34804	10842	5199	3227	63499
	225 - 269	850	429	729	1538	9190	8763	5868	2918	30285
	270 - 314	3510	2501	1695	2819	5212	5164	20490	15478	56869
	315 - 359	14839	4485	2118	2158	2253	2154	13788	55972	97767
COLUMN TOTALS:	51166	27053	19825	25573	62421	30270	56415	98639	371562	
BIASES:	0.99	1.00	1.01	1.00	1.02	1.00	1.01	0.99		

PERCENT CORRECT: 43.7728

HEIDKE SKILL SCORE: 0.33043

CHI SCORE: 39.21

CASES = 371562

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS
GEM								
0 - 100	109	374	101	63	31	203	305	1186
200 - 400	299	5560	2416	806	205	1137	750	11173
500 - 900	203	3092	4855	2187	468	1107	961	12873
1000 - 2900	119	1144	3326	16841	4487	4498	608	31023
3000 - 6000	30	494	429	6620	40130	16449	593	64745
CLR BELOW 6001	358	1197	1172	5132	23292	210328	1456	242937
X/-X	144	1499	666	565	491	1605	2655	7625
COLUMN TOTALS:	1262	13360	12965	32214	69104	235327	7330	371562
BIASES:	0.94	0.84	0.99	0.96	0.94	1.03	1.04	

PERCENT CORRECT: 75.4862

HEIDKE SKILL SCORE: 0.54901

CHI SCORE: 940.19

THREAT SCORE: 0.30728

CASES = 371562

CLOUD HEIGHT ONE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	X/-X	ROW TOTALS
PERSISTENCE								
0 - 100	109	374	101	63	31	203	305	1186
200 - 400	329	6104	2833	1187	373	1743	820	13389
500 - 900	191	2792	4728	2466	547	1094	792	12610
1000 - 2900	138	1049	3159	17084	5383	4805	670	32288
3000 - 6000	6	410	280	5868	40973	19854	527	67918
CLR BELOW 6001	344	1117	1153	4974	21280	206051	1442	236361
X/-X	145	1514	711	572	517	1577	2774	7810
COLUMN TOTALS:	1262	13360	12965	32214	69104	235327	7330	371562
BIASES:	0.94	1.00	0.97	1.00	0.98	1.00	1.07	

PERCENT CORRECT: 74.7716

HEIDKE SKILL SCORE: 0.54352

CHI SCORE: 70.86

THREAT SCORE: 0.31040

CASES = 371562

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
GEM							
C - 100	59	31	50	57	11	826	1034
200 - 400	214	363	340	203	102	734	1956
500 - 900	39	271	884	863	139	2307	4503
1000 - 2900	145	291	1316	4935	2009	6749	15445
3000 - 6000	22	50	196	2051	23524	34850	60693
CLR BELOW 6001	654	923	1646	6077	19685	258946	287931
COLUMN TOTALS:	1133	1929	4432	14186	45470	304412	371562
BIASES:	0.91	1.01	1.02	1.09	1.33	0.95	

PERCENT CORRECT: 77.7020

H E SKILL SCORE: 0.35061

ORE: 6110.73

THREAT SCORE: 0.12386

AS = 371562

CLOUD HEIGHT TWO (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
PERSISTENCE							
0 - 100	70	107	87	85	15	907	1271
200 - 400	214	363	340	203	103	736	1959
500 - 900	35	168	821	1134	180	2012	4350
1000 - 2900	149	274	1098	4318	2057	6291	14187
3000 - 6000	22	50	189	1876	19139	23406	44682
CLR BELOW 6001	643	967	1897	6570	23976	271060	305113
COLUMN TOTALS:	1133	1929	4432	14186	45470	304412	371562
BIASES:	1.12	1.02	0.98	1.00	0.98	1.00	

PERCENT CORRECT: 79.6021

HEIDKE SKILL SCORE: 0.34388

CHI SCORE: 34.06

THREAT SCORE: 0.13615

CASES = 371562

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
	0 - 100	0	0	0	0	0	0
	200 - 400	0	0	0	0	0	0
	500 - 900	0	0	2	1	1	4
GEM	1000 - 2900	1	12	38	91	573	826
	3000 - 6000	0	151	405	262	13778	17873
	CLR BELOW 6001	58	519	2100	2672	13041	352859
	COLUMN TOTALS:	59	682	2545	3026	16429	371562
	BIASES:	0.00	0.00	0.00	0.27	1.09	1.01

PERCENT CORRECT: 90.9240

HEIDKE SKILL SCORE: 0.14630

CHI SCORE: 5051.14

THREAT SCORE: 0.00000

CASES = 371562

CLOUD HEIGHT THREE (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
	0 - 100	0	0	1	5	0	59
	200 - 400	0	9	20	28	94	705
	500 - 900	7	19	166	59	285	2528
PERSISTENCE	1000 - 2900	9	36	153	276	452	2944
	3000 - 6000	15	115	394	360	2876	16172
	CLR BELOW 6001	28	503	1811	2298	12722	349154
	COLUMN TOTALS:	59	682	2545	3026	16429	371562
	BIASES:	1.00	1.03	0.99	0.97	0.98	1.00

PERCENT CORRECT: 90.1919

HEIDKE SKILL SCORE: 0.15288

CHI SCORE: 7.45

THREAT SCORE: 0.00602

CASES = 371562

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
CLR BELOW 6001	207969	27145	3049	2688	240851
SCT	24125	39413	10712	13228	87478
BKN	53	420	287	590	1350
OVC	2457	9118	6750	23558	41883
COLUMN TOTALS:	234604	76096	20798	40064	371562
BIASES:	1.03	1.15	0.06	1.05	

PERCENT CORRECT: 72.9964
HEIDKE SKILL SCORE: 0.49064
CHI SCORE: 20137.01

CASES = 371562

CLOUD COVER ONE

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
CLR BELOW 6001	204837	25350	2884	2519	235590
SCT	24003	34590	7905	8752	75250
BKN	3049	7480	3878	6365	20772
OVC	2715	8676	6131	22428	39950
COLUMN TOTALS:	234604	76096	20798	40064	371562
BIASES:	1.00	0.99	1.00	1.00	

PERCENT CORRECT: 71.5178
HEIDKE SKILL SCORE: 0.47591
CHI SCORE: 13.91

CASES = 371562

CLOUD COVER TWO

VERIFYING OBSERVATION

	CLR BELOW	6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	274409	17533	9145	7300	308387
GEM	SCT	17528	7642	5445	3157	33772
	BKN	3443	1622	1937	1439	8441
	OVC	10941	2426	3458	4137	20962
	COLUMN TOTALS:	306321	29223	19985	16033	371562
	BIASES:	1.01	1.16	0.42	1.31	

PERCENT CORRECT: 77.5443
HEIDKE SKILL SCORE: 0.26363
CHI SCORE: 8905.57

CASES = 371562

CLOUD COVER TWO

VERIFYING OBSERVATION

	CLR BELOW	6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	273212	16872	9353	7655	307092
PERSISTENCE	SCT	16421	6430	3805	1944	28600
	BKN	8972	3964	4151	2936	20023
	OVC	7716	1957	2676	3498	15847
	COLUMN TOTALS:	306321	29223	19985	16033	371562
	BIASES:	1.00	0.98	1.00	0.99	

PERCENT CORRECT: 77.3198
HEIDKE SKILL SCORE: 0.26324
CHI SCORE: 17.45

CASES = 371562

CLOUD COVER THREE

VERIFYING OBSERVATION

		CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	330451	6534	7508	6692	351185
GEM	SCT	2449	315	416	382	3562
	BKN	6484	508	812	926	8730
	OVC	5197	499	854	1535	8085
	COLUMN TOTALS:	344581	7856	9590	9535	371562
	BIASES:	1.02	0.45	0.91	0.85	

PERCENT CORRECT: 89.6521

HEIDKE SKILL SCORE: 0.15255

CHI SCORE: 2771.24

CASES = 371562

CLOUD COVER THREE

VERIFYING OBSERVATION

		CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
	CLR BELOW 6001	325637	5874	6955	6475	344941
PERSISTENCE	SCT	5890	772	656	331	7649
	BKN	6731	727	1041	947	9446
	OVC	6323	483	938	1782	9526
	COLUMN TOTALS:	344581	7856	9590	9535	371562
	BIASES:	1.00	0.97	0.98	1.00	

PERCENT CORRECT: 88.6076

HEIDKE SKILL SCORE: 0.17031

CHI SCORE: 8.00

CASES = 371562

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
GEN	0 < 1/2	267	191	222	310	159	1290
	1/2 < 1	164	512	436	270	85	1650
	1 < 3	280	726	7130	4898	1573	17197
	3 < 5	302	465	6637	14390	6483	36152
	5 < 7	120	132	1925	9228	11820	33746
	7 +	38	153	1571	5356	15238	281527
COLUMN TOTALS:		1171	2179	17921	34452	35358	280481
BIASES:		1.10	0.76	0.96	1.05	0.95	1.00

PERCENT CORRECT: 78.9343
 HEIDKE SKILL SCORE: 0.48383
 CHI SCORE: 331.05
 THREAT SCORE: 0.21994

CASES = 371562

VISIBILITY (MILES)

VERIFYING OBSERVATION

	0 < 1/2	1/2 < 1	1 < 3	3 < 5	5 < 7	7 +	ROW TOTALS
PERSISTENCE	0 < 1/2	282	220	272	341	198	1488
	1/2 < 1	187	613	651	429	155	2325
	1 < 3	261	660	7210	5171	1710	17882
	3 < 5	268	403	6301	13936	6260	34769
	5 < 7	142	133	1920	9322	12246	35579
	7 +	31	150	1567	5253	14789	279519
COLUMN TOTALS:		1171	2179	17921	34452	35358	280481
BIASES:		1.27	1.07	1.00	1.01	1.01	1.00

PERCENT CORRECT: 78.5915
 HEIDKE SKILL SCORE: 0.48033
 CHI SCORE: 103.28
 THREAT SCORE: 0.22215

CASES = 371562

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS	
GEM	0 - 10	318288	16069	3328	97	9	337791
	11 - 20	11244	7365	3154	77	0	21840
	21 - 30	3260	3194	4619	808	19	11900
	31 - 40	9	0	3	19	0	31
	41 +	0	0	0	0	0	0
COLUMN TOTALS:		332801	26628	11104	1001	28	371562
BIASES:		1.01	0.82	1.07	0.03	0.00	

PERCENT CORRECT: 88.8926
HEIDKE SKILL SCORE: 0.38482
CHI SCORE: 1960.78

CASES = 371562

GUSTS (KTS)

VERIFYING OBSERVATION

	0-10	11-20	21-30	31-40	41 +	ROW TOTALS	
PERSISTENCE	0 - 10	315043	14908	3520	141	9	333621
	11 - 20	14495	8530	2979	43	0	26047
	21 - 30	3187	3129	4069	543	10	10938
	31 - 40	67	61	534	257	9	928
	41 +	9	0	2	17	0	28
COLUMN TOTALS:		332801	26628	11104	1001	28	371562
BIASES:		1.00	0.98	0.99	0.93	1.00	

PERCENT CORRECT: 88.2488
HEIDKE SKILL SCORE: 0.38109
CHI SCORE: 22.50

CASES = 371562

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	82	333	85	62	14	358	934
200 - 400	487	5542	2448	1137	162	1583	11359
500 - 900	147	2338	3675	1714	212	1594	9680
GEM 1000 - 2900	43	849	2856	12254	3052	5410	24464
3000 - 6000	0	129	187	2771	26635	16433	46155
CLR BELOW 6001	284	1042	1088	4684	14887	256985	278970
COLUMN TOTALS:	1043	10233	10339	22622	44962	282363	371562
BIASES:	0.90	1.11	0.94	1.08	1.03	0.99	

PERCENT CORRECT: 82.1325

HEIDKE SKILL SCORE: 0.56295

CHI SCORE: 399.71

THREAT SCORE: 0.37629

CASES = 371562

CEILING (FEET)

VERIFYING OBSERVATION

	0- 100	200- 400	500- 900	1000- 2900	3000- 6000	CLR BELOW 6001	ROW TOTALS
0 - 100	102	450	160	43	23	314	1092
200 - 400	427	5043	2243	1086	149	1360	10308
500 - 900	172	2458	3774	1856	193	1711	10164
PERSISTENCE 1000 - 2900	56	874	2740	11531	2651	4875	22727
3000 - 6000	0	222	246	3350	25690	15021	44529
CLR BELOW 6001	286	1186	1176	4756	16256	259082	282742
COLUMN TOTALS:	1043	10233	10339	22622	44962	282363	371562
BIASES:	1.05	1.01	0.98	1.00	0.99	1.00	

PERCENT CORRECT: 82.1456

HEIDKE SKILL SCORE: 0.55582

CHI SCORE: 10.98

THREAT SCORE: 0.36159

CASES = 371562

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
CLR BELOW 6001	209025	21969	5834	5408	242236
SCT	19244	16659	8436	12908	57247
BKN	864	828	517	1073	3282
OVC	5471	8303	8780	46243	68797
COLUMN TOTALS:	234604	47759	23567	65632	371562
BIASES:	1.03	1.20	0.14	1.05	

PERCENT CORRECT: 73.3240
HEIDKE SKILL SCORE: 0.50166
CHI SCORE: 19745.89

CASES = 371562

TOTAL CLOUD AMOUNT

VERIFYING OBSERVATION

	CLR BELOW 6001	SCT	BKN	OVC	ROW TOTALS
CLR BELOW 6001	204837	20380	5350	5023	235590
SCT	19793	14072	5673	7614	47152
BKN	4975	5744	4413	8365	23497
OVC	4999	7563	8131	44630	65323
COLUMN TOTALS:	234604	47759	23567	65632	371562
BIASES:	1.00	0.99	1.00	1.00	

PERCENT CORRECT: 72.1150
HEIDKE SKILL SCORE: 0.49141
CHI SCORE: 13.52

CASES = 371562

END

DATE

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